WADC TECHNICAL REPORT 53-484
PART III
VOLUME II

THE PHYSIOLOGICAL BASIS FOR VARIOUS CONSTITUENTS IN SURVIVAL RATIONS

PART III. THE EFFICIENCY OF YOUNG MEN UNDER CONDITIONS OF MOIST HEAT APPENDICES OF METHODS AND ORIGINAL DATA

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UNIVERSITY OF ILLINOIS

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WRIGHT AIR DEVELOPMENT CENTER
AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

NOTICES

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AERO MEDICAL LABORATORY
CONTRACT NO. AF 18(600)-80
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WRIGHT AIR DEVELOPMENT CENTER
AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Carpenter Litho & Prtg. Co., Springfield, O.
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FOREWORD

The investigations described in this report were carried out during the summer of 1955. In the spring the detailed protocol was designed, and supplies and equipment were assembled. In June the test team and subjects moved to Camp Atterbury and for one week were indoctrinated. A 36-day metabolic investigation was made at that camp during late June and July. The biological specimens collected and the clinical observations made were analyzed in the laboratories of the Department of Physiology and the Health Service Research Unit, McKinley Hospital, University of Illinois, Urbana, between September 1955 and December 1956. The research was supported by Contract No. AF 18 (600)-80 with the Aero Medical Laboratory, Directorate of Laboratories, WADC, Project No. 7156, "Flight and Survival Foods, Feeding Methods, and Nutritional Requirements," Task No. 71805, "Nutritional Physiology of Men under Air Force Operational Conditions and Emergency Situations," (formerly RDO No. 698-81, "Survival Ration Requirements"). The Contract Monitor was Doctor H. C. Dyme, Chief, Nutrition Section; the Project Scientist, Lieutenant Colonel A. A. Taylor, USAF (VC); and the Task Engineer, 1/Lieutenant (now Captain) L. A. Whitehair, who served also as Liaison Officer during the field tests. Lieutenant Colonel Roy W. Otto, Chanute AFB, served throughout as the Project Officer. This report constitutes the results of the joint efforts of the responsible investigators, R. E. Johnson and F. Sargent, II, and a team of civilian and military associates to whom most of the credit should go for the success of these studies. A team roster is included in Volume I, Section VII, of this report.

This investigation would not have been possible without the generous cooperation of the University Health Service, especially in making space available in the laboratories of the Health Service Research Unit at McKinley Hospital, University of Illinois.

We wish to acknowledge the generous cooperation received from the Air Research and Development Command, Air Training Command, Fifth Army, and the Purchasing Department of the University of Illinois. To Mrs. Evelyn M. Robbins, Miss Martha Prather, Mrs. Jeanne Detry, Mrs. Norma Templin, Mrs. Phyllis M. Johns, and Miss Janet Abell we extend our thanks for assistance in editing this report and typing the final copy. To Mrs. Marie Litterer we are indebted for the quantitative charts.

ABSTRACT

From June 22, 1955, through July 27, 1955, 100 volunteer airmen served as subjects in a study of survival rations in moist heat at Camp Atterbury, Indiana. The original data collected during the 36-day period of study on these 100 volunteer airmen are detailed in these appendices. In addition, special studies are reported on renal osmotic regulation and chemical analysis of sweat. A method for analyzing ketone bodies in blood, urine, and sweat is described together with a full report of alterations in ketone body metabolism observed during the 1954 winter study at Camp McCoy and the 1955 summer study at Camp Atterbury.

PUBLICATION REVIEW

This report has been reviewed and is approved.

FOR THE COMMANDER:

for Edward ... Lt Col USAF
JOHN P. STAPP
Colonel, USAF (MC)
Chief, Aero Medical Laboratory
Directorate of Laboratories

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A. A NEWLY DETECTED SOURCE OF SMALL ERROR IN THE MICRO-KJELDAHL ANALYSIS FOR TOTAL NITROGEN IN URINE, FOOD, AND FECES

During the course of revalidation of methods for this year's work, the reproducibility, specificity and reliability of our routine method for the analysis of total nitrogen were studied (Consolazio, Johnson, and Marek, 1951). The method involves three steps: a digestion with sulfuric acid in the presence of copper sulfate and dipotassium phosphate; a distillation in the micro-Kjeldahl still described by Keys (1940), the ammonia being trapped in 2% boric acid; and a titration with standard dilute sulfuric acid in the presence of the indicator of Ma and Zuazaga (1942). An unexpected source of small error was detected, which is interesting enough to warrant recording for the benefit of others. The error lies in the retention of small amounts of NH_3 in the Keys' still. In addition to correcting this error, we have incorporated two modifications into the apparatus which expedite the routine analysis of very large numbers of specimens.

There follows a step-by-step discussion of the method as we now use it.

Digestion. We have no reason to be dissatisfied with the sulfuric acid - copper sulfate - disodium phosphate procedure for digesting urine, feces, and food. Duplicate results within 5% of the smallest titration are required before we accept a value; usually the results are better. On a typical morning, the following results were obtained with urine (Table AI.1):

TABLE AI.1

REPRODUCIBILITY OF MICRO-KJELDAHL ANALYSES OF URINE

Subject Number	Titrations Still 1 ml H_2SO_4	Titrations Still 2 ml H_2SO_4	Percentage Reproducibility (Lowest/Highest)x100
46	0.315	0.335	94.0
47	0.215	0.230	93.5
48	0.360	0.375	96.0
49	0.385	0.380	98.7
51	0.115	0.145	79.2
52	0.295	0.305	96.7
53	0.775	0.755	97.3
54	0.815	0.835	97.7
55	1.185	1.180	99.7
56	1.425	1.415	99.3
57	1.010	1.050	96.1
58	0.680	0.670	98.5
59	0.380	0.390	97.4
60	0.400	0.405	98.7
Mean reproducibility, %			95.9

As one would expect, when titrations are low, percentage variation is higher than when titrations are high. Nevertheless, overall reproducibility is excellent.

The exact procedure we now follow for this step is:

1) Into the Kjeldahl flask pipette 0.5 ml of urine aliquot, fecal homogenate or food homogenate by means of a syringe pipette.
2) Wash down neck with distilled water from a compression wash bottle.
3) For urine, add 10 ml of a mixture of 10 N H_2SO_4 containing 0.4% $CuSO_4 \cdot 5H_2O$, using an automatic glass pipette. For food and feces, use 20 ml of this mixture.
4) From a calibrated spatula, for urine add 1.5 gm of K_2HPO_4 (anhydrous). For food and feces add 3.0 gm.
5) Add 3-5 glass beads to prevent bumping.
6) Digest to a clear blue-green, with no evidence of carbon left; such evidence is a brown color or black specks in the flask.

<u>Distillation of Ammonia</u>. In the original Keys' still, air is sucked through an acid-trap to remove NH_3 preformed in the air. It goes through a long glass tube to the bottom of the glass digestion flask, which is mounted on an inverted U-head by means of a standard-tapered glass joint. Through this head, the air goes to the top of an upright water condenser, and thence into a 15-ml tube containing 2% boric acid, which traps the NH_3. Finally, the air is sucked into a vacuum line. To evolve ammonia, 30% NaOH is added through a side arm in the long glass air tube, and drains into the digestion flask where the following reaction takes place: $(NH_4)_2SO_4+2NaOH = 2NH_3+Na_2SO_4+2H_2O$.

In order to insure a quantitative yield of NH_3, the distillation flask is boiled. For a source of heat we use an electric hot plate, to which current is fed through a "Variac" variable rheostat. After 10 ml of distillate have collected in the boric acid tube, the collecting tube is lowered until the tip is out of the fluid, and the heat is turned off.

After experiencing a considerable amount of erraticism during September, 1955, we discovered that the inverted U-head of the Keys' still can lead to about a 5% error by refluxing back a little NH_3, thus preventing quantitative recovery and accurate reproducibility of results with urine and feces. The evidence that this is true was obtained in a series of experiments in which either distilled water or standard $(NH_4)_2SO_4$ was distilled as usual, and then with no change of flask or reagents was boiled again, and once again. As Table AI.2 proves, a single boiling was insufficient to assure quantitative distillation of NH_3: If now the head was wrapped with a heavy insulator, such as a first layer of asbestos twine and a second of aluminum foil, the error became small and reproducible, because the whole head was heated to the same temperature as the flask, and refluxing was minimized.

TABLE AI. 2

RETENTION OF NH_3 BECAUSE OF REFLUXING IN STILL HEADS DURING MICRO-KJELDAHL ANALYSIS

Fluid in Distillation Flask	Condition of Head	Titrations after Successive Boilings		
		First ml	Second ml	Third ml
Distilled H_2O	Uninsulated	0.048	0.010	0.010
$(NH_4)_2SO_4$ Standard	Uninsulated	1.600	0.100	0.012
Distilled H_2O	Insulated	0.028	0.010	0.010
$(NH_4)_2SO_4$ Standard	Insulated	1.642	0.035	0.011

To summarize this kind of experiment, the sum of three successive boilings with standard minus the sum of three boilings of blank is the same, regardless of the temperature of the head of the still. In the above experiment it was (1.712 - 0.068) or 1.644 for the uninsulated head, and (1.688 - 0.048) or 1.640 for the insulated. However, insulation of the still head permits a recovery of from 93 to 98% of the theoretical amount of NH_3 on the first boiling. In the above experiment 93.5% of theory was achieved on one boiling with an insulated still head.

Therefore, it appears that we have solved a small mystery that has always puzzled workers with this particular micro-Kjeldahl method, which, in our hands, has never permitted 100% recovery of added ammonium sulfate. The answer appears to lie in a small amount of refluxing at the still head.

Clearly, 100% recovery would be most desirable, but with this method, two successive boilings are required to achieve perfection. As a practical compromise, and provided the error is small and reproducible, one can incorporate into the final calculation an empirical correction factor based on the average day's run. We have elected to adopt this compromise with perfection. To arrive at an empirical factor, within each group of twelve digestion flasks, one contained a reagent blank, one an $(NH_4)_2SO_4$ standard, and the rest duplicate specimens of urine. This procedure was followed routinely for several days, until enough data had accumulated to permit calculation of an empirical correction factor. During the period Sept. 28 - Oct. 4, 1955, in fourteen successive runs, recoveries calculated as percent of theory were: 94.5, 94.7, 94.5, 95.2, 93.2, 93.2, 92.7, 92.7, 93.2, 92.7, 92.7, 94.2, 94.6, 94.8, 92.7, 94.7, 95.7, with a mean of 93.9%. This last is the empirical correction factor which we are now using.

Titration. In the original Keys' method, a Rehberg burette delivering 0.3 N H_2SO_4 was used. We have been able to speed up titrations considerably,

without sacrificing accuracy, by the use of an automatic 5-ml burette and a large reservoir of acid.

The collection tube, containing 12 ml of a mixture of boric acid, water, and Ma-Zuazaga indicator is clamped in a stand in such a position that the long tip of a 5-ml microburette just projects into the fluid and a narrow polyethylene tube of one-mm bore projects to the bottom. Through the polyethylene tube air bubbles slowly from a commercial fish-bowl aerator after passing through a trap of dilute acid. (This trap is necessary to remove blank from the air.) The burette is filled as needed with 0.1 N H_2SO_4 from a 25-liter reservoir of standard acid, one-liter portions being pumped by air pressure into a suspended aspirator bottle. From the bottom of the aspirator bottle acid can enter the burette through its two way stopcock. Titration acid comes out through the other half of this stopcock, and the collecting tube need not be touched once it has been mounted.

Summary.

1. Refluxing at the still head can lead to retention of NH_3 and low results in the Keys' micro-Kjeldahl method. This error can be minimized by insulating the still head.

2. An empirical correction factor, long known to exist in this micro-method is thus explained.

3. Titration is speeded up by abandoning the Rehberg burette in favor of an automatic filling 5-ml burette, and by the use of a large reservoir of standard acid.

B. MICRO BLOOD SUGAR DETERMINATION
(Field Method)

Reagents:

1. Alkaline copper tartrate. Dissolve 40 gm of pure anhydrous sodium carbonate in 400 ml of water in a liter flask. Add 7.5 gm of tartaric acid (USP). When latter has dissolved, add 4.5 gm of crystallized cupric sulfate (USP). Mix and dilute to volume.

2. Phosphomolybdic solution. To 35 gm of A.C.S. molybdic acid (anhydrite) and 5 gm of A.C.S. sodium tungstate, add 200 ml of 10% sodium hydroxide and 200 ml of water. Boil vigorously for 20 to 40 minutes. Cool. Dilute to about 350 ml and add 125 ml of concentrated 85% phosphoric acid. Dilute to 500 ml.

3. 0.115 N sulfuric acid.

4. 1% sodium tungstate solution. Dilute 10% solution 1-10.

5. Standard solutions. Dilute the stock glucose solution (1 gm of dextrose in 100 ml of 0.25% benzoic acid; 1 ml = 10 mg) as follows:

   a. 5 ml to 100 ml of water: 1 ml = 0.5 mg of glucose.

   b. 10 ml to 100 ml of water: 1 ml = 1.0 mg of glucose.

Apparatus:

1. Quantity of Lusteroid test tubes.

2. Quantity of 18 x 150-mm Pyrex test tubes previously optically matched.

3. Several 100-ml mixing cylinders.

4. Quantity of pipettes: 0.1 ml and 2 ml; 25-ml serological; 10-ml syringe.

5. Angle-head centrifuge.

6. Coleman Jr. Spectrophotometer, Model 6.

7. Hot plates and pans to serve as water bath.

Procedure:

1. Add exactly 2.0 ml of 0.115 N H_2SO_4 to a Lusteroid tube.

2. Add exactly 0.1 ml of whole blood (blow-out pipette) and mix.

3. Let stand for a few minutes and add 3.0 ml of the 1% sodium tungstate solution and mix.

4. Centrifuge until supernatant solution is clear. In angle-head centrifuge, about ten minutes will be required.

5. Transfer 2.0 ml of clear supernatant liquid into a matched 18 x 150-mm Pyrex test tube.

6. Add 2.0 ml of the alkaline copper tartrate solution. Mix by tapping bottom of the tube.

7. Boil in water bath for 6 minutes.

8. Cool for 3 minutes in a water bath (25°C).

9. Add 2.0 ml of phosphomolybdate solution. Mix by tapping bottom of the tube.

10. Let stand for 10 minutes.

11. Mix by swirling and tapping tube, and dilute to 13 ml, by adding 7.0 ml of distilled water.

12. Invert several times to mix.

13. Measure optical density at 650 mμ against a similarly treated reagent blank set at 0.0.

Blank:

Steps 1-12 except step #2

Standards and Calculations:

1. Run two standards, 50 mg/100 ml and 100 mg/100 ml, with each series of unknowns.

2. Calculate glucose concentration in unknowns from standard curve.

Remarks:

All specimens will be run in duplicate from the beginning, not from the centrifugate stage.

C. MINERALS AND ORGANIC COMPOUNDS IN WATER, SERUM, FECES, AND FOOD

1. Chemical Analysis of Tap Water and Distilled Water

Food, Urine and Feces. Tap water was used in all cooking during the summer study, 1955. Chemical analysis was performed by standard methods for sodium, potassium, chloride, phosphorus, and calcium (Table AI. 3 A). The water was hard, calcium carbonate being the probable chief molecule. The mean value for three sets of specimens was 5.5 mg Ca per 100 ml, and this value will be used for computing calcium intake from water. There was a very small amount of sodium and potassium (means of 0.56 mg Na per 100 ml and 0.19 mg K per 100 ml); those amounts were so small that they can be neglected except during the experimental periods.

Distilled water was used for diluting all specimens of urine, food, and feces. This water was distilled in Urbana with two different stills, transferred to five-gallon Jerry cans (coated), transported to Camp Atterbury by truck or airplane, and stored there until used. For use, it was poured into twenty-gallon aluminum stockpots, and used from the spigots of these stockpots. The chances of contamination were numerous, so that numerous specimens were collected at every period of diluting urine or feces (Table AI. 3 B and C). Fortunately, the water turned out to be excellent. There was no chloride or phosphorus, and such small amounts of sodium, potassium, and calcium that no correction need be applied for these minerals in computing the analytical data for food, urine, and feces. Presumably the tiny amounts that were actually detected came from the coated Jerry cans.

Serum. Vials in which the sera were to be stored and centrifuge tubes into which venous blood was transferred after venipuncture were rinsed with distilled water. Chemical analysis of this distilled water was conducted each time a three-hour test was made. The water turned out to be excellent (Table AI. 4), and no corrections for the minerals of the serum had to be made.

Organic Compounds in Water. The distilled water used for rinsing vials and diluting urinary specimens were tested for the organic compounds creatinine, creatine, urea nitrogen, and so on. The tests were uniformly negative. None of the concentrations of organic compounds in serum and urine had to be corrected for contamination of the water. Likewise, water stored in tin cans did not develop significant contamination which was interfering with the measurement of these compounds.

2. Chemical Analysis of 5-in-1 Food Items and Feces

For pre-periods and in recovery, the regimen of all subjects, except FRA's, was prepared from items of 5-in-1 ration (1954 procurement). The analytical data available to us consisted of water, nitrogen, and calcium.

TABLE AI.3

CHEMICAL ANALYSIS OF TAP WATER AND DISTILLED WATER: CAMP ATTERBURY, SUMMER 1955 (mg/100 ml)

Specimen Identification		Sodium mg Na	Potassium mg K	Chloride mg Cl	Phosphorus mg P	Calcium mg Ca
		A. Tap Water				
T 24	June 24	0.36	0.09	0	0	4.7
X 2	July 2	0.64	0.23	0	0	5.5
X 11	July 11	0.68	0.25	0	0	6.2
		B. Distilled Water For Diluting Urine				
T 22-29	1-20	0.27	0	0	0	0
	21-40	0.13	0	0	0	0
	41-60	0.12	0	0	0	0
	61-80	0.09	0	0	0	0.05
	81-101	0.13	0	0	0	0
T 29-X4	1-19	0.11	0	0	0	0
	20-41	0.16	0	0	0	0
	42-62	0.12	0	0	0	0
	63-83	0.32	0.01	0	0	0
	84-101	0.13	0	0	0	0
X 6-11	1-20	0.14	0.02	0	0	0
	21-37	0.14	0.01	0	0	0
	38-44	0.09	0	0	0	0
	91-95	0.09	0	0	0	0
	45-68	0.77	0.03	0	0	0
	69-88	0.48	0	0	0	0
EXP II	1-60	0.17	0	0	0	0
	61-102	0.16	0	0	0	0
REC I	1-60	0.36	0.48	0	0	0
	61-102	0.28	0.13	0	0	0
REC II	1-30	0.24	0.03	0	0	0
	31-60	0.35	0.24	0	1.0	0
	61-90	0.43	0.58	0	0.005	0
	91-102	0.20	0.18	0	0	0
		C. Distilled Water For Diluting Feces				
X 22-28	1-13	0.33	0.40	0	0	0
	14-90	0.20	0.09	0	0	0
	91-31	0.38	0.29	0	0.025	0
	31-39	0.30	0.20	0	0.025	0
	39-45	0.25	0	0	0.025	0.20
	46-55	0.16	0	0	0.037	0
	56-98	0.22	0.06	0	0.007	0.36
	67-75	0.13	0	0	0	0.36
	77-85	0.14	0	0	0	0.15
	86-101	0.18	0.07	0	0.020	0.05
1		0.18	0.03	0	0.025	0.26
2		0.16	0	0	0	0.05
3		0.40	0.19	0	0	0.05
4 Broken Sample List		----	----	-	----	----

TABLE AI.3 (Contd)

Specimen Identification	Sodium mg Na	Potassium mg K	Chloride mg Cl	Phosphorus mg P	Calcium mg Ca
5	0.00	0.00	0	0.005	0.00
6	0.17	0.00	0	0	0.00
7	0.14	0.03	0	0	0.00
8	0.00	0.03	0	0	0.00
9	0.14	0.06	0	0	0.05
10	0.17	0.00	0	0	0.05
11	0.40	0.19	0	0.007	0.05
12	0.22	0.07	0	0	0.41
13	0.19	0.06	0	0	0.31
14	0.16	0.09	0	0	0.15
15	0.13	0.00	0	0	0.62
16	0.18	0.09	0	0	0.05
17	0.13	0.03	0	0	0.20
18	0.16	0.10	0	0	0.20
19	0.17	0.06	0	0	0.15
20	0.20	0.20	0	0	0.10
21	0.17	0.10	0	0	0.05
22	0.16	0.11	0	0	0.62
23	0.25	0.23	0	0	0.26
24	0.14	0.12	0	0	0.15
25	0.25	0.19	0	0	0.36
26	0.13	0.04	0	0	0.15
27	0.13	0.00	0	0	0.15
28	0.09	0.00	0	0	0.00
29	0.16	0.00	0	0	0.26
30	0.07	0.00	0	0	0.26
31	0.11	0.00	0	0	0.26
32	0.17	0.00	0	0	0.15
33	0.16	0.00	0	0	0.05
34	0.09	0.00	0	0	0.15
35	0.13	0.00	0	0	0.78
36	0.16	0.00	0	0	0.05
37	0.13	0.00	0	0	0.00
38	0.18	0.00	0	0	0.00
39	0.17	0.00	0	0	0.00
40	0.13	0.00	0	0	0.00
41	0.13	0.00	0	0	0.46
42	0.25	0.15	0	0.005	0.00

TABLE AI. 4

CHEMICAL ANALYSIS OF DISTILLED WATER
CAMP ATTERBURY, JULY 1955
SERUM WATER BLANKS

Specimen Identification	Sodium mEq/l	Potassium mEq/l	Chloride mEq/l	Phosphorus mg/100 ml	Calcium mg/100 ml
X 2--SB	0	0	4.1	0.20	0.51
X 2--SB	0	0	2.2	0.03	0.40
X 2--SC	0	0	2.2	0.00	0.32
X 2--SC	0	0	2.2	0.02	0.89
X 3--SA	0	0	0.3	0.05	0.85
X 3--SB	0	0	1.2	0.02	0.55
X 3--SB	0	0	1.2	0.03	0.55
X 3--SC	0	0	2.2	0.00	1.15
X 3--SC	0	0	2.2	0.00	0.59
X 10--SA	0	0	2.2	0.05	0.55
X 10--SA	0	0	1.2	0.30	0.11
X 10--SB	0	0	3.2	0.05	0.71
X 10--SB	0	0	0.3	0.30	0.36
X 10--SC	0	0	0.3	0.00	0.99
X 10--SC	0	0	0.3	0.00	1.15
X 11--SA	0	0	0.0	0.05	0.51
X 11--SA	0	0	0.0	0.00	0.20
X 11--SB	0	0	0.0	0.15	0.75
X 11--SB	0	0	0.3	0.15	0.36
X 11--SC	0	0	1.2	0.20	0.55
X 11--SC	0	0	0.3	0.05	0.51
X 14	0	0	2.2	0.15	0.20
X 14	0	0	1.7	0.15	0.12
X 14	0	0	2.2	0.15	0.20
X 14--SC	0	0	0.0	0.05	0.51
X 15--SC	0	0	0.3	0.03	0.83
X 15	0	0	0.3	0.40	0.12
X 19--SB	0	0	1.2	0.20	0.40
X 19--SB	0	0	0.0	0.05	0.32
X 19--SC	0	0	0.0	0.05	0.12
X 20--SB	0	0	0.3	0.03	0.04
X 20--SB	0	0	1.2	0.20	1.94
X 20--SC	0	0	0.0	0.00	0.42
X 20--SC	0	0	1.2	0.02	0.29
X 24--SA	0	0	1.2	0.00	0.91
X 24--SA	0	0	0.3	0.15	0.91
X 24--SB	0	0	2.2	0.20	1.19
X 24--SB	0	0	0.7	0.05	1.11
X 24--SC	0	0	0.0	0.03	0.55
X 24--SC	0	0	0.0	0.12	0.79
X 25--SA	0	0	0.0	0.30	0.36
X 25--SB	0	0	0.0	0.15	0.40
X 25--SB	0	0	0.0	0.20	0.91
X 25--SC	0	0	0.0	0.30	0.95
X 25--SC	0	0	1.2	0.70	1.15

Apparently no systematic analyses of all items have been made for sodium, potassium, chloride, and phosphorus.

Methods. Analysis of chloride was by the same method as in 1954 (Sargent, et al., 1955). After ashing was completed, sodium, potassium, and phosphorus were estimated as in 1954. However, we have simplified the ashing procedure to such an extent that it appears worth reporting in some detail, because it may help others who need to analyze food and feces routinely for these minerals.

Each of the minerals sodium, potassium, and phosphorus has peculiarities which necessitate careful control at all stages of ashing. Sodium and potassium volatilize easily at temperatures over 550°C, potassium having the higher vapor pressure. Hence, a standard period of four hours at 550°C is to be rigidly enforced. Under these conditions phosphorus is converted to a form that will not react quantitatively with the alpha-amino-naphthol-sulfonic acid reagent that is commonly used (cf. Consolazio, Marek, and Johnson, 1951). We postulate that phosphate is dehydrated to pyrophosphate according to the reaction: $2PO_4^{---} + 2H^+ \rightarrow P_2O_7^{----} + H_2O$.

After ashing the extract must be taken up in relatively strong hot HCl (about 0.5 N) and then boiled for at least 10 minutes. Hydrolysis occurs, and the resulting phosphate reacts satisfactorily. Evidence for this sequence is presented in Table AI.5. A specimen of lima beans was ashed alone, and with a known added amount of potassium dihydrogen phosphate. Appropriate reagent blanks and standards also were ashed. Subsequent to ashing, the extract was treated in four different ways: (a) insufficient boiling; (b) sufficient boiling; (c) insufficient acid; (d) sufficient acid. Clearly, adequate boiling with strong enough acid permits quantitative recovery of added phosphate. No other treatment does. We have decided upon 15 minutes of boiling; i.e., treatment simmering in a boiling water bath.

A further observation that enabled us to simplify the procedure was that lithium ions (used in flame photometry) do not interfere with the estimation of phosphorus or of calcium. Hence, one ashing and a single extraction suffice for the subsequent estimation of sodium, potassium, calcium, and phosphate in samples of food and feces. The procedure we recommend is:

(1) With the rapid grinding procedure of Johnson, Pandazi, and Sargent (1955), homogenates of food or feces are prepared. A dilution of about 1:10 is employed for food, about 1:20 for feces.

(2) Into a "Vycor" crucible 5 ml of homogenate is placed by means of a wide bored syringe pipette.

(3) The crucible is muffled at 550°C for exactly four hours.

(4) It is removed and cooled, and leached out with successive portions of 0.5 N HCl kept boiling on a hot plate. A rubber policeman is used vigorously to insure solution.

(5) The requisite amount of $LiNO_3$ (necessary in flame photometry) is added, and the final volume is adjusted to exactly 100 ml with 0.5 N HCl.

TABLE AI. 5

EFFECTS OF ACID AND BOILING ON THE RECOVERY OF PHOSPHATE IN ASHING OF FOOD

(Results are expressed as mg P added to crucible)

Sample	0.1 N HCl		0.5 N HCl	
	10' boil	20' boil	10' boil	20' boil
1. Direct blank	0.000	0.000	0.000	0.000
2. Direct standard (i.e., not ashed)	0.330	0.335	0.330	0.330
Theory	0.328	0.328	0.328	0.328
3. Ashed blank	0.000	0.000	0.000	0.000
4. Lima beans	0.092	0.095	0.093	0.096
5. Ashed standard	0.227	0.293	0.317	0.357
6. Lima beans, plus standard	0.267	0.350	0.420	0.465
Recovery of added standard	0.175	0.255	0.327	0.359

TABLE AI. 6

QUANTITATIVE RECOVERY OF SODIUM, POTASSIUM, CALCIUM, AND PHOSPHORUS ADDED TO FOOD AND FECES

Content of Crucible	Amount of Substance (mg/100 ml extract)			
	Na	K	P	Ca
A. Feces				
1. Blank	0.04	0.00	0.00	0.00
2. Standard	0.07	2.47	2.08	5.32
3. Fecal Homogenate	0.29	2.37	3.12	4.27
4. Fecal Homogenate plus standard	0.25	4.93	5.20	10.10
5. Theory	0.00	2.52	2.00	5.30
B. Food				
1. Blank	0.00	0.00	0.00	Not done
2. Standard	3.49	3.11	6.34	Not done
3. Food Homogenate (lima beans)	2.26	3.35	1.86	Not done
4. Food Homogenate plus standard	5.75	6.47	8.40	Not done
5. Theory	3.32	3.00	6.56	Not done

(6) The extract is transferred to a 120-ml bottle and placed in a boiling water bath for exactly 15 minutes.

(7) After cooling, sodium, potassium, calcium, and phosphorus are all estimated from the single extract.

Validation studies on food and feces proved the accuracy of this method (Table AI.6). In all cases, the recovery of standard added to feces or food was excellent.

Results. Since only Menus 1, 3, 4, and 5 were used, these were the menus subjected to analysis of sodium, potassium, chloride, and phosphorus. As stated above, data for calcium and nitrogen were already available; hence, these constitutents were not estimated. Our data are presented in Table II.16 (WADC TR 53-484, Part 3, Vol. I).

D. CHEMICAL ANALYSIS OF SWEAT

1. Method of Collection

Sweat was collected during the "heat acclimatization test." Prior to the tests the subjects shaved both forearms. On the afternoon of the test the arms were rinsed with distilled water and dried with paper towels. Each forearm and hand was then enclosed in an elbow-length rubber glove, the open end of which was secured with a rubber band.

At the completion of the march (one-hour) each glove was carefully removed to avoid spilling of the sample. Sweat from each arm was pooled; measured for volume, in order to calculate rate (ml/min); and then divided into two fractions:

Fraction one: the sample for field analysis. Two types of analyses were conducted in the field: 1) qualitative analyses, e.g., pH, glucose, albumin, and ketone bodies, and 2) the examination of the sediment by microscopic analysis similar to the Addis method in urinalysis.

Fraction two: the sample for future analyses. This sample was immediately frozen in dry-ice in an one-ounce brown bottle to avoid degradation and evaporation of the specimen. It was used exclusively for quantitative analyses, e.g., freezing point depression, sodium, potassium, chloride, creatinine, urea nitrogen, ammonia, lactic acid, and total ketone bodies.

2. Glove Blanks

To assure that we did not have to correct the chemical analysis for contaminants within the gloves themselves, 25 ml of distilled water was placed in a glove. The glove was closed with a rubber band and then fastened to the waist of one subject in each flight during each performance of the heat acclimatization test. After the march, the distilled water was transferred to an one-ounce brown bottle. It was subjected to all the chemical analyses which were performed on the specimens of sweat.

The vast majority of the glove blanks tested negatively for the many substances measured. Only an occasional specimen contained detectable amounts of one or another of these substances. Since most of the glove blanks were negative, we shall not present the data in tabular form. Throughout, no corrections had to be made for "glove blanks."

3. Qualitative Tests

Fraction I was centrifuged according to technic for preparing urinary sediment (Sargent, et al., 1954). The supernatant was qualitatively tested with chemical reagents; the sediment was studied microscopically.

pH. Determined with Hydrion paper obtained from the Micro-Essential Laboratory.

Glucose. Determined with "Clinitest" tablets obtained from the Ames Company, Inc. No modifications.

Albumin. Determined by the sulfosalicylic acid method described in a manual from the Harvard Fatigue Laboratory (1945). No modifications.

Ketone Bodies. Determined by the nitroprusside method described in a manual from the Harvard Fatigue Laboratory (1945). No modifications.

Sediment. The sediment of sweat was classified quantitatively after the method of Addis. The fresh, undiluted sweat sample was prepared according to the technique of Sargent, et al., (1954). Six cellular elements were measured. They were:

1. Blue refractive polymorphic crystals
2. Yellow amorphous sediment
3. Epithelial cells
4. White blood cells
5. Yeast and starch
6. Miscellaneous material

4. Quantitative Tests

Freezing Point Depression. The freezing point depression of sweat was determined with the Fiske Osmometer supplied by Fiske Associates, Incorporated, of Boston, Massachusetts. This instrument is based on the physical fact that the osmotic pressure of a solution and the depression of the freezing point of the solvent are directly proportional to the molecular concentration of the dissolved substance, total ion, and molecular count in the case of ionized solutions. The osmometer (referred to as the "Fiske") essentially measures freezing point but is calibrated to read directly osmotic pressure units, i.e., milliosmols/liter. One milliosmol per liter depresses the freezing point of water 0.00186°C.

Temperature is measured electronically by means of a special resistance type "Thermistor" thermometer, in a Wheatstone bridge circuit in combination with a sensitive galvanometer, using the null balance method. The rest of the equipment consists of a thermostatically controlled freezing bath and necessary sample stirring and seeding equipment (Fiske Osmometer Instruction Manual, 1954). This device was calibrated with standard molar solutions of sodium chloride prepared according to the International Critical Tables, Volume IV, 1928. They are correct for activity. Table AI.7 shows weights and osmotic pressures (mOsm/l) calculated and observed.

TABLE AI.7

CALIBRATION DATA ON FISKE "OSMOMETER"
(standard solutions made according to instructions in "Fiske" manual)

Weight Sodium Chloride (grams/liter)	Dial Reading Observed (mOsm/L)*	Calculated Osmotic Pressure (mOsm/L)	Activity Coefficient Fiske	Activity Coefficient International Critical Tables**	Freezing Point Thermometer #1 (°C)*
3.074	98	100	0.960	0.961	-0.21
5.606***	174	180	0.951	0.952	-0.39
9.404	294	300	0.940	0.942	-0.61
12.860	406	400	0.934	0.936	-0.83
15.900	494	500	0.930	0.931	-1.04
24.080	768	750	0.923	0.925	-1.55
32.150	---	1000	0.921	0.921	------

* Corrected for distilled water.

** Activity coefficients used by Fiske Company to correct for activities of NaCl. Calculated at this laboratory.

*** Calculated at this laboratory to obtain a standard close to the mean osmolarity of sweat.

Distilled Water Blank. In working with the "Fiske" it was observed that the distilled water blank continuously, over a period of 10 months, gave a reading of 10 mOsm/L ±1.5. An experiment was set up to determine the effect of this "background" on the osmolarity of our samples. Three subjects were used. The experiment consisted of stepping on and off a 10-in. box once every two seconds. Sweat samples were collected in elbow-length rubber gloves. This work experiment was carried out in an environment of 94°F D.B. and 84°F W.B. (70% R.H.) for one hour. The sweat samples were transferred immediately into bottles which were frozen until ready for analysis. Each specimen was analyzed at two dilutions plus the raw undiluted sample. They were as follows: undiluted, 1:1 dilution, 1:4 dilution. Two hypotheses were tested.

(1) If the reading of distilled water is a machine correction, then
$Y = BX - 10$, where
Y = theoretical reading of sample = reading of undiluted sample - 10
B = dilution correction factor
X = reading of diluted sample

(2) If the reading is a physical property of distilled water, then each sample should be corrected according to the equation
$Y = B(X - 10)$

The standard error of the machine is ±1.5 mOsm/L, determined by actual experimentation. Therefore, we may conclude that any deviation of the actual results from ±1.5 plus a small error in dilution should approximate the theoretical. Table AI.8 summarizes the results of the experiment.

TABLE AI. 8

DATA TO TEST HYPOTHESES ON DILUTION EFFECT ON SWEAT (mOsm/l)

Dilution Factor (B)	Fiske Reading (X)	Theoretical (Y)	Actual* (1)	Actual* (2)
1	110.5	100.5	100.5	100.5
2	61.5	100.5	113.0	103.0
4	36.0	100.5	134.0	104.0
1	86.0	76.0	76.0	76.0
2	48.0	76.0	86.0	76.0
4	29.0	76.0	106.0	76.0
1	200.5	190.5	190.5	190.5
2	105.5	190.5	201.0	191.5
4	56.0	190.5	214.0	184.0

* Numbers in parentheses refer to equations above.

These data indicate that the second hypothesis is true. Therefore, it is necessary that the factor 10 mOsm/l be subtracted from the osmolarity as determined by the Fiske Osmometer if such values are to be true on an absolute basis. The value was also used to correct osmolarity of serum and urine.

Osmotic effect of cellular debris: In view of the desire not to discard specimens of sweat after determination of the freezing point, a study was made of factors influencing the freezing point of sweat in the presence of small amounts of cellular debris present in most specimens (Table AI. 9). Ten specimens of sweat were chosen from one week's "heat acclimatization test." First, the uncentrifuged specimen was measured in the Fiske. Then the specimen was centrifuged and the supernatant sweat was measured. The differences were quite small and regular. In every case, the freezing point of the supernatant sweat was about 0.001°C lower than that of the uncentrifuged specimen, i.e., a difference averaging 2.65 milliosmols per liter. It was decided that centrifuging the specimen is not necessary for routine osmometry. In all sweat osmotic data, a correction of 2.5 milliosmols per liter was added to the value for the uncentrifuged specimen.

Sampling specimens of sweat: As a precaution against contamination of the specimens, the syringe pipette used to transfer the sweat into the tube for the Fiske osmometer was rinsed with a saline solution. Each week, an average for Flight 1 was calculated, and a "wash saline" made up to approximate this mean.

Effect of varying concentration of sweat on osmolarity: In the course of further analyses a question arose: at high molal concentrations of sweat

TABLE AI.9

ESTIMATION OF OSMOLARITY OF SWEAT: CENTRIFUGED VS. UNCENTRIFUGED SPECIMENS

Subject No.	Date of Test	Osmolarity, mOsm/liter A Supernatant	B Uncentrifuged	(A-B)
31	June 27	131.5	130.5	+1.0
33	June 27	123.5	122.5	+1.0
34	June 27	154.0	152.5	+1.5
36	June 27	182.5	179.0	+3.5
38	June 27	146.5	141.0	+5.5
39	June 27	96.5	94.5	+2.0
46	June 27	186.0	182.5	+3.5
47	June 27	108.0	105.5	+2.5
50	June 27	135.5	133.5	+2.0
54	June 28	148.0	144.0	+4.0
			Mean Difference	+2.65
			Mode	+2.5

is there an interaction among the molecules in the solution? The primary interest here was to determine if the molality of a known concentration of "synthetic" sweat would equal the sum of its constituents. In the "synthetic" sweat all solutions were made on a·molal basis. This mixture, dissolved in 1000 gm of water, contained the following:

106.521 gm of NaCl = 180 m Mol/kg of Na and Cl
1.683 gm of KOH = 30 m Mol/kg of K
0.681 gm of NH_3 (as NH_4OH) = 40 m Mol/kg of NH_3
6.306 gm of lactic acid (racemic) = 70 m Mol/kg of lactic acid
4.204 gm of urea = 70 m Mol/kg urea

The pH of this solution, measured with pH paper, was 4.3 without adjustment. Assuming complete ionization, the total molality should have been 0.570; with the sum of the anions, 0.250; the sum of the cations, 0.250; and urea, an unionized substance, contributing 0.070 Mol/kg.

The mixture represented a concentrated sweat in regards to total molality. If the effect of interaction is related to the molal freezing point depression there should be some function expressing the relation between the observed and calculated molality.

Table AI.10 shows the dilutions and results with both the Fiske Osmometer and a Beckmann thermometer. A plot of the "Fiske" data would show that the relation of the observed osmolality, corrected for the distilled water "background," to the calculated osmolality of the "synthetic" sweat is linear.

TABLE AI.10

DATA TO TEST HYPOTHESIS CONCERNING "SYNTHETIC SWEAT"

Stock (0.570 mols/kg) (ml)	Distilled Water (ml)	Calculated Molality* (mol/kg)	Observed Molality by Freezing Point Depression: Fiske Osmometer Dial Reading (mol/kg)	Fiske Osmometer Corrected** Reading (mol/kg)	Δ (%)	Beckmann fp (C°)	Beckmann Thermometer Corrected (mol/kg)	Δ (%)
0	100	0.00	0.010	0.00		+0.13		
10	90	0.057	0.060	0.050	88	+0.01	0.056	98
20	80	0.114	0.113	0.103	90	-0.12	0.115	100+
40	60	0.228	0.214	0.204	90	-0.36	0.227	100-
60	40	0.342	0.318	0.308	90	-0.55	0.315	92
80	20	0.456	0.424	0.414	91	-0.73	0.395	87
100	0	0.570	0.528	0.518	91	-0.98	0.510	90

* Assuming complete dissociation

** Corrected for distilled water

Δ This indicates percentage difference between observed and calculated

The difference between the two functions, the theoretical curve and the calculated versus the observed, is equal to 10% ± 2% at all osmolalities. The interaction is constant and depends only on the number of dissolved particles in solution. The observed osmolarity is not a function of dilution when sweat is synthetically prepared. The Beckmann data yield similar results.

Two conclusions may be drawn from these data. First, the molal freezing point depression is independent of dilution in the range of the present experimentation. Second, if it is assumed that ionizable substances are ionized to 90% ± 2%, the sum of the constituents of this "synthetic sweat" accounts for all the osmolality at pH 4.3. This is true only for "synthetic sweat", not for "true sweat". The difference between "true" sweat and "synthetic" sweat will be discussed at length in Appendix VIII.

To further check the independence of dilution another experiment was designed. A second purpose was to check the validity of the sodium chloride standards used in all experimentation. Molal solutions of NaCl were made at various concentrations in the range of from 0.02 to 0.30. The results are shown in Table AI.11. A plot of these data would show that the relation between the observed osmolality, as measured by the "Fiske", and the calculated osmolality is linear. This plot of the calculated osmolality of 0.91 ± 0.01; and its linearity verifies the fact that the molal freezing point depression is independent of dilution and that the "Fiske" does measure osmolarity and osmolality accurately for solutions of various concentrations within its range. Therefore, the data to be presented in mOsm/L may be converted to mMol/kg by simple calculations and would still be represented by a same linear function within the range of the present experimentation.

The Beckmann thermometer data (Table AI.11) were somewhat inconsistent both with a specific thermometer and between two different thermometers. We conclude that although the "Fiske" is a more reliable instrument than the Beckmann, within its range, neither the "Fiske" nor the Beckmann can be used as an absolute instrument. A calibration curve must be used for the determination of unknown concentrations.

Sodium. Determined by flame photometry (Baird Associates, Third Edition, 1953). No modifications.

Potassium. Determined by flame photometry (Baird Associates, Third Edition, 1953). No modifications.

Chloride. Determined by the method of Keys (Consolazio, Johnson, and Marek, 1951). No modifications.

Creatinine. Determined by the method of Haugen and Blegen (1953). The following modifications were made:

1. Used 0.5 ml of sweat and 0.5 ml distilled water instead of 1.0 ml sweat

TABLE AI.11

DATA OF EXPERIMENT TESTING INDEPENDENCE OF DILUTION USING BECKMANN THERMOMETER AND FISKE OSMOMETER

Weight (NaCl/ 500 gm) (gm)	Calculated Molality (mol/kg)	F.P. Depression* °C	Fiske Readings (milliosmols) Actual Osm/L	Fiske Readings (milliosmols) Corr.** Osm/L	Beckmann Thermometer #1 Reading °C	Beckmann Thermometer #1 Corr.** mol/kg	Beckmann Thermometer #2 Reading °C	Beckmann Thermometer #2 Corr.** mol/kg
0.5845	0.02	3.570	0.047	0.037	+0.03	0.045	-0.33	0.060
0.7533	0.026	3.553	0.058	0.048	-0.00	0.062	-0.34	0.064
1.1690	0.04	3.530	0.084	0.074	-0.06	0.095	-0.39	0.085
2.3380	0.08	3.488	0.156	0.146	-0.21	0.162	-0.56	0.161
2.9225	0.10	3.478	0.192	0.182	-0.33	0.215	-0.65	0.200
5.8450	0.20	3.424	0.372	0.362	-0.67	0.378	-0.99	0.365
8.7675	0.30	3.403	0.556	0.546	-1.06	0.572	-1.36	0.552
3.0740+	0.053	3.510	0.108	0.098	-0.07	0.100	-0.42	0.100
9.4040+	0.161	3.440	0.304	0.294	-0.52	0.300	-0.87	0.300
15.9000+	0.272	3.409	0.509	0.499	-0.91	0.500	-1.25	0.500
Distilled Water	0.00		0.010**		+0.12**		-0.20**	

* Molal freezing point lowering obtained from International Critical Tables, Vol. 4, 1928

** Corrected for distilled water

\+ Values given in Fiske Osmometer Instruction Manual, 1954 (gm/l). NaCl standards corrected for activities, International Critical Tables, Vol. 4, 1928. These standards were used to determine a calibration curve in the three determinations shown here.

2. Used 8.0 ml distilled water instead of 12N sulfuric acid
3. Used 1.0 ml distilled water instead of 10% sodium tungstate

Urea. Determined by a urease method (Consolazio, Johnson, and Marek, 1951) with one modification. Permutit was not used as prescribed by the method (see ammonia determination).

Lactic Acid. Determined by the method of Barker and Summerson (Hawk, Oser, and Summerson, 1954). Four modifications were made. They were:

1. Used 0.1 ml non-filtered sweat instead of 0.2 ml of filtered.
2. Diluted with 10 ml of 2% $CuSO_4$ instead of 1 ml of 20% + 9 ml of distilled H_2O.
3. Omitted 0.5 ml of 4% $CuSO_4$.
4. Omitted evaporation with 4% $CuSO_4$; added 6 ml of H_2SO_4 immediately after centrifuging and transferring.

Ammonia. No actual analytical determination was made for amount because of the volume of the sample. During nine standardizing analyses with and without permutit the following results were obtained:

	Without Permutit	With Permutit
N	9	9
ΣX	3183	2532
X	35.37	28.13

If we assume that the analyses of sweat without permutit represent combined urea-N and ammonia-N and that the analysis of sweat with permutit represents urea-N; then the percentage of ammonia-N in the analysis without permutit may be calculated in the following manner:

$$\%NH_3 - N = \frac{35.37 - 28.13}{35.37} \times 100 = 20.46\%$$

The percentage was adjusted from 20.46 to 20.00 for ease of calculation.

Total Ketone Bodies. Determined by the method of Sargent, et al. (see Appendix IX). No modifications.

E. ESTIMATION OF TOTAL BODY WATER BY DEUTERIUM OXIDE DILUTION

1. Method for Measuring D_2O in Urine, Sweat, and Water

References: Moore, F. D. Determination of Total Body Water with Solids and Isotopes. Science, 104:157 (1946).

Principle: Total body water is estimated by the dilution of a known amount of heavy water. It is assumed that heavy water and ordinary water are identical. The estimation of total body water by deuterium oxide dilution involves the following phases:

1. Introduction of deuterium oxide via oral dose in water.

2. Estimation of deuterium oxide in urine.
   a. Acid distillation of urine.
   b. Alkaline-permanganate distillation of product of stage a.
   c. Estimation of D_2O/H_2O ratio in product of stage b.

Procedure:

Phase 1. Introduction of Deuterium Oxide.

The protocol for oral administration of deuterium oxide has been discussed in detail in Table II.21 (WADC TR 53-484, Part 3, Vol. I).

Phase 2. Estimation of Deuterium Oxide in Urine.

Stage A. Acid distillation of urine.
Stage B. Alkaline-permanganate distillation of product of Stage A.

These two procedures were carried out with only slight modifications according to the methods outlined in WADC TR 53-484, Part 2, Vol. II (Appendix I).

Stage C. Estimation of D_2O/H_2O ratio in product of Stage B. This estimation was carried out in principle according to the procedure described in detail in WADC TR 53-484, Part 2, Vol. II (Appendix I). However, major modifications were introduced in the method. These were embodied in the manner of construction of the calibration curve from which the urinary D_2O/H_2O ratios were determined. According to the previous method, a series of standard D_2O solutions were prepared by dilution of pure D_2O with distilled water. These standards were then distilled (Stages A and B) and were used to construct a calibration curve. In the current series of determinations, aliquots of the D_2O (40 gm/100 ml) administered as test doses to the subjects were saved. From this D_2O, series of "dose standards" were prepared by dilution with distilled water, which were then distilled (Stages

A and B). These standards were used to construct a calibration curve (0.00 to 0.20% D_2O, in 0.02% increments), from which curve the urinary D_2O/H_2O ratios were determined.

2. Steps for Calculation of D_2O Space

1. Collection periods during the pre-period test were 12 hours for most subjects. In the experimental period test these periods were variable, but accurately timed.

2. Urine volumes were recorded in ml.

3. Sweat and insensible water (IW) volumes were calculated for the specific hours of the collection period in question.
   a. Sweat volumes were calculated for individual subjects by subdividing the hours of each collection period into time spent in various activities, i.e., hard work, moderate work, light work, or resting.
   b. When an hourly diary had thus been constructed for each subject, sweat loss was calculated as follows:
      (1) Hard Work
      (ml total sweat loss in heat acclimatization test, PRE II or EXP II) x (hrs. hard work during period in question).
      (2) Moderate Work
      (ml total sweat loss, as above) x (0.5) x (hrs. moderate work during period in question).
      (3) Light Work
      (ml total sweat loss, as above) x (0.33) x (hrs. light work during period in question).
   c. Insensible water loss was calculated as:
   Body wt. on day of D_2O admin. (kg) x (0.66 ml/kg/hr) x (hrs. spent resting during period in question).
   d. Total extrarenal fluid loss during collection period = sweat lost in hard work (ml) + sweat lost in moderate work (ml) + sweat lost in light work (ml) + insensible water loss during resting (ml).

4. D_2O lost in urine (gm) = (D_2O in original urine, gm/100 ml,-0.0056) x urine volume (ml) x 1/100.
The factor 0.0056 represents a "method blank"; i.e., the mean D_2O/H_2O ratio of the July 4 Pre-D_2O urines of all subjects. This factor was subtracted from all D_2O/H_2O ratios determined analytically.

5. D_2O lost in sweat and IW (gms) = (D_2O in original urine, gm/100 ml, -0.0056) x (0.6) x (sweat IW volume, ml) x 1/100. (In a series of experiments in which sweat and urine or expired moisture and urine were collected simultaneously, it was found that the mean ratio of sweat or IW D_2O/H_2O ratio to urinary D_2O/H_2O ratio was 0.6, not 1.0 as reported previously.)

6. For pre-period test (July 4), D_2O space (liters) = (D_2O remaining at mid-point of Post-D_2O period, gm) ÷ (D_2O/H_2O ratio in Post-D_2O urine-0.0056).

7. For the experimental period test (July 14), D_2O space (liters) = (D_2O remaining at mid-point of Post-D_2O period) ÷ (D_2O/H_2O ratio of Post-D_2O urine, corrected for decrement of D_2O administered July 4-0.0056).

8. Correction of the D_2O/H_2O ratios of the experimental test urines for decrement of D_2O remaining from pre-period test involved the following procedures:
   a. Four subjects received 60 gm of D_2O on July 4, but none on July 14. They were therefore designated as decrement controls. The urinary D_2O/H_2O ratios of these subjects were determined as for all other subjects. The D_2O remaining from the July 4 dose could thus be assessed.
   b. These D_2O/H_2O ratios were plotted at mid-points of the collection periods on July 4 and July 14-15. Since the decrement in the ratios appeared to be linear on the latter dates, these data were extrapolated back to the Post-D_2O period on July 4 by means of best fit of a line connecting the three July 14-15 ratios. The mean between observed and extrapolated Post-D_2O ratios on July 4 was -0.0388. This factor was later adjusted to -0.0200 by trial calculation of FRA data (vide infra).
   c. Accurate mid-point times of the Post-D_2O period (July 4) and the Pre-D_2O, and Post-D_2O periods (July 14-15) were plotted as urinary D_2O/H_2O ratios for each flight. The actual mid-point decrement correction factors were determined graphically by extending a line joining the (July 4 Post-D_2O ratio -0.0200) and the Pre-D_2O (July 14) ratio through the mid-points of the D_2O and Post-D_2O periods (July 14-15). These correction factors were then subtracted from the ratios determined analytically, and the corrected ratios used for calculating D_2O loss.
   d. The extrapolated correction factor was adjusted to -0.0200 by trial calculation of FRA data. The D_2O spaces of FRA subjects had previously been calculated on the assumption that the decrement of D_2O urine during the experimental test was accurately expressed as a loss of 0.5% of the Pre-D_2O ratio per hour during the D_2O and Post-D_2O periods. These calculations gave results which appeared reasonable when expressed either as liters or as % body weight. When, however, these calculations were repeated using the extrapolated correction factor of -0.0388, the D_2O spaces became unreasonable. The factor was changed by trial calculation to -0.0200, which allowed the D_2O spaces (% body wt.) of FRA subjects to remain the same in PRE II and EXP II tests, when the decrement corrections were made as in (c) above.
   e. When subjects were removed from their regimens early and special calculations were made necessary, the decrements were determined in the same manner as in (c) above, by placing the mid-points of

collection period at the appropriate time and date. A linear decrement between July 4 and July 15 is therefore assumed.

9. Since D_2O administered orally equilibrates with other body fluids in approximately 3.5 hr (Hurst et al, 1952), the urinary D_2O/H_2O ratio at the mid-point of the D_2O period was found to be useful in a system of internal checks in calculation. D_2O spaces were calculated using both D_2O period ratios and Post-D_2O period ratios. In most cases these two values agreed within 1.5-2.0 liters. In certain cases, however, no such close agreement was achieved, and in these cases the mean D_2O spaces of these two periods were accepted as being truly representative.

F. MAXIMAL VOLUNTARY HYPERVENTILATION

Principle: Increasing use is being made of maximum voluntary hyperventilation for fifteen seconds as a measure of pulmonary capacity. It is better than vital capacity because it involves some effects of acid-base balance and muscle strength, which vital capacity does not.

Materials:

1. One gas meter, calibrated in liters.
2. One length of corrugated respiration hose and one 2-inch length of 1-inch tubing.
3. Three hose clamps to fit above hoses.
4. Large bore 3-way respiratory gas tap.
5. Double Douglas valve.
6. Clean mouthpiece.
7. Noseclip.
8. Clock or watch, reading to nearest second.

Procedure:

1. The gas meter is set up on a table. The three-way tap is clamped on inlet of meter. The corrugated hose is attached to inlet by tap. The Douglas valve is arranged so that subject breathes from air into gas meter, or through tap to air.
2. Seat the subject comfortably near the gas meter setup. Attach noseclip in place, and fit mouthpiece comfortably, with subject holding valve in one hand at a convenient position.
3. Turn tap to "air", and read dial.
4. At zero time simultaneously turn tap to gas meter and give signal "START!"
5. The subject breathes as fast as he can, and as deeply as he can.
6. At exactly 15 seconds, simultaneously give signal "STOP!" and turn tap to air.
7. Have subject remove noseclip and valve.

8. Read dials.

Precautions:

1. The commonest source of error is inadequate cooperation. Experienced subjects give reproducible results. If there is any doubt about the validity of a test, repeat it.

2. Occasionally a subject leaks air around the mouthpiece. Watch for this.

G. MEASUREMENT OF RESPIRATORY METABOLISM WITH GAS METERS

References:

Johnson, R. E., Benedix, R. H., Evans, R. D. and Cohen, M.: Measurement of Respiratory Metabolism with Gas Meters. (unpublished)

Consolazio, C. F., Johnson, R. E., and Marek, E.: Metabolic Methods. C. V. Mosby Co., St. Louis, 1951.

Principles:

The total inspired air volume, the total expired gas volume and the total expired gas volume less carbon dioxide are determined for a measured period of time by utilizing an appropriate gas meter series and a device which will completely absorb expired carbon dioxide. Oxygen consumption is the difference between the total inspired air volume (meter 1) and the expired gas volume less carbon dioxide (meter 3). The carbon dioxide produced during the same period is determined by taking the difference between the total expired gas volume (meter 2) and the expired gas volume less carbon dioxide (meter 3). Since gas meters do not give absolute values, appropriate correction factors must be applied.

Apparatus:

1. Three dry gas meters with metric dial calibration; capacity 5 to 150 cu. ft./hr. (May be procured from the Arthur H. Thomas Co., Phila., Pa.)

2. Carbon dioxide absorber. A sheet metal cylinder of 30 liter capacity containing pumice lumps soaked with 30% potassium hydroxide. Its reservoir should be calibrated to contain only enough fluid to fill the absorber to the top hole.

3. Air/water-vapor saturator.

4. Connecting hose, 1-inch diameter, rubber. Approximately ten feet are required to effect the necessary connections (Arthur H. Thomas Co., Phila., Pa.).

5. Cloth-covered corrugated rubber hose pieces, 32 in. long. Three lengths are required for connecting the apparatus to the water saturator and the Douglas respiratory valve.

6. Flutter valves. (Procurable from A. H. Thomas Co.)

7. Double Douglas valve. (Procurable from A. H. Thomas Co.)

8. Rubber mouthpiece for Douglas valve and sponge nose clip. (Procurable from A. H. Thomas Co.)

9. Thermometers, student grade, $-10^{o}C.$ to $110^{o}C.$ Three are required. These should be calibrated in a water bath against a certified standard thermometer. They are installed at inlet of M_1, and outlet of M_2 and M_3.

10. Barometer, corrected to station level.

11. Stopwatch or wall clock with sweep second hand.

Reagents:

30% potassium hydroxide. U.S.P. or technical grade may be used. This should be made in a metal container, and should be cooled to room temperature before it is used in the apparatus. (See Attachment 1 for details of making up KOH.) Because of the relative insolubility of sodium salts, NaOH must not be used.

Procedure: The Subject:

1. In determining the resting metabolism the subject need not be in the postabsorptive state but should be allowed to rest quietly for at least thirty minutes preceding the test. The subject's height, weight, and age should be recorded. The respiratory rate should be measured at the midpoint of the test.

2. The subject should recline on a comfortable bed or cot. It is imperative that he be comfortable and warm. If unfamiliar with the test he should be assured that it is neither harmful nor painful in any way.

Procedure: Preparation of Apparatus at Beginning of Day:

1. After each day's work, the pumice-KOH absorbing unit will have been left full of water, and the 30% KOH will have been stored in a 3-gallon can. It is necessary to do this washing daily in order to dissolve out $KHCO_3$ and K_2CO_3 formed on the pumice during the day's work.

2. At the beginning of the day's work, it is necessary to recharge the CO_2 absorber with 30% KOH.

   a. Remove clamp from reservoir exit, drain out all tap water and discard.

   b. Reclamp reservoir exit, and fill reservoir to calibration line with 30% KOH. (See Attachment 2 for this calibration.)

   c. Remove plug.

d. Run KOH in and out of absorber unit twice, and at the third filling let stand fifteen minutes to insure saturation of the pumice with KOH.

3. During subsequent runs, only a single filling and emptying is required for charging.

Procedure: Preparation for a Run:

1. Charge the CO_2 absorber with potassium hydroxide solution by replacing the solid rubber plug in the upper vent with the glass sight gauge plug and by releasing the hosecock between the reservoir and the absorber tank. The reservoir should be raised to a level about two feet higher than the top of the absorber to facilitate rapid flow. When fluid appears in the sight gauge, lower the reservoir to the floor and allow the fluid to run out of the absorber until it reaches the "full line" on the reservoir. Now replace the sight gauge plug with the solid rubber stopper and tighten the hosecock.

2. Adjust the rubber mouthpiece and Douglas valve to the subject's mouth. The valve mouthpiece and connecting hoses may be suspended over the bed or may be allowed to rest on the subject's chest with the aid of a light pillow. Adjust the nose-clip so that it neither leaks nor causes discomfort. The subject may be best able to make this adjustment.

Procedure: Warmup Period:

It is necessary for consistent results to let the subject breathe through the meter system for a two-minute period preceding the actual test run. This is accomplished by turning the aluminum shuttle valves from the "by-pass" to the "meter" position. Immediately before the measured run, turn both taps to "by-pass" position, so that initial readings may be made. Record meter readings to nearest 5 ml.

Procedure: The Measured Run:

1. Either of two alternative procedures may be used for turning the taps. The purpose of both is to start the subject breathing through M_2 at the end of an expiration, and through M_1 at the beginning of the next succeeding inspiration. For successful results, the turning of taps correctly is essential.

   a. Hold a zero-set stop watch in the left hand and take note of the subject's respiratory pattern. During any given expiration turn the intake valve to the "meter" position. At the end of the expiration start the stop watch and turn the outlet valve (Subject to Meter #2) to the "meter" position. The subject will now be inspiring through Meter #1 and expiring through Meter #2, the carbon dioxide absorber, and Meter #3, respectively; and will have commenced the measured run at the end of a complete respiratory cycle.

b. If a clock with a continuously running sweep second hand is to be used, the preferable maneuver is to turn both taps simultaneously at the end of a normal expiration, and note the time of turning, to the nearest second.

2. During the first minute of the measured run note the temperature for each meter, making thermometer calibration corrections where required. At the eighth minute of the ten-minute run, again note and record the temperatures of all meters.

3. At approximately minute five, note the time at which an expiration is finished, and measure the duration for 10 complete expirations. From these data enter the respiratory rate, breaths per minute.

4. Either of two alternative methods may be used for turning off the taps. In both, the object is to turn off the subject at the end of a normal expiration, as close to ten minutes as possible. Correct turning of the taps is essential for correct data. This point is critical. Depending on the option adopted in Step 1, proceed according to one of the following alternatives:

   a. As the measured interval approaches 10 minutes take the stop-watch in the left hand and place the right hand on the intake shuttle-valve. During the last expiration before the ten-minute mark, as determined by the movement of the meter dial indicator on Meter #2, turn the intake shuttle-valve to the "by-pass" position. When the expiration is complete (Meter #2 dial indicator ceases moving) stop the stop-watch, and turn the outlet valve to the "by-pass" position. Note the exact reading of the stop-watch, and record.

   b. If a continuous running sweep second hand is being used, as the measured time interval approaches 10 minutes, place one hand on each tap, and at the expiration nearest ten minutes, turn both taps and record time to the nearest second.

5. Record the final dial readings for each of the three meters.

6. If a second measured run is contemplated it may be started immediately after recording the meter dial readings. The final readings of the first run then serve as the initial readings for the second run. Follow the same protocol as given above, including the recording of temperatures during the first and last minutes of the run, and the respiratory rate starting at about minute five.

Computations:

1. The basic equations are simple. However, several important correction factors must be applied so as to obtain correct data. The fundamental equations are:

   O_2 consumption = $(M_1 - M_3)$
   CO_2 production = $(M_2 - M_3)$
   RQ = (CO_2 production) ÷ (O_2 consumption)
   Pulmonary ventilation = M_2

2. The correction factors are:

   a. All gas volumes must be reduced to standard temperature and pressure (0°C and 760 mm Hg), dry.

   b. Each meter has its own correction factor that must be applied to obtain absolute values (i.e., values that are the same as those of a Tissot gasometer). See Attachment 2 for details on how to determine this correction factor for each meter.

   c. The CO_2 absorber unit may introduce a small error into the reading of M_3. This correction may be different for CO_2 and O_2. See Attachment 2 for details on the determination of this correction factor.

3. As modified by these various correction factors, the fundamental calculations are:

   M_1 (corrected) = M_1 (raw reading) x STP factor x M_1 correction
   M_2 (corrected) = M_2 (raw reading) x STP factor x M_2 correction
   M_3 (corrected) = M_3 (raw reading) x STP factor x M_3 correction x (CO_2 or O_2 correction factor, if any)

4. Step by step, the calculations thus become:

   a. Raw Volumes, Mean Temperature, and Urine.

      (1) Subtract the initial meter reading for each meter from the final reading. Enter this difference on the data sheet as raw volume.
      (2) Compute the mean meter temperature for each meter by averaging the two recorded temperatures. (T)
      (3) Compute time to the nearest 0.1 minute by the formula:

      $$\text{Time} = \text{mins.} + \frac{\text{secs.}}{60}$$ See attached table.

   b. Barometric Pressure and STP Factor.

      (1) Record barometric pressure to the nearest millimeter of mercury. If the barometer is calibrated in milli-

bars or inches, use the accompanying table for conversion to millimeters.

(2) By nomogram or computation determine the factor necessary to reduce the raw volume of gas, saturated with water vapor at temperature T and pressure P (ambient barometric pressure in mm mercury), to its volume at standard temperature and pressure (STP). The nomogram for this purpose is available as a wall chart or it may be found in Metabolic Methods, Consolazio, Johnson, and Marek, page 334.

c. Meter Corrections.

(1) Record the preestablished meter corrections for M_1, M_2, or M_3 of the particular metabolic unit in use.
(2) Convert all STP volumes to corrected M_1, M_2, or M_3 by multiplying by appropriate factor.
(3) In the case of M_3 apply the further CO_2 correction factor (if any) for that particular unit.

d. Calculation of Pulmonary Ventilation, Oxygen Consumption, Carbon Dioxide Production, and Respiratory Quotient.

Pulmonary Ventilation, L/min = M_2 (corrected)

$$Q_2\text{, ml/min} = \frac{M_1 \text{ (corrected)} - M_3 \text{ (corrected for } Q_2\text{)}}{\text{minutes}}$$

$$CO_2\text{, ml/min} = \frac{M_2 \text{ (corrected)} - M_3 \text{ (corrected for } CO_2\text{)}}{\text{minutes}}$$

Respiratory Quotient = CO_2/O_2

e. Calculation of Heat Production.

The classical method of calculating heat production is given in Hawk, Oser, and Summerson, 12th Ed., (1951), Blakiston, New York, pp. 655-664. A simplified, approximate method is given in Consolazio, Johnson, and Marek (1951), page 338.

Example of Typical Calculations:

The attached forms represent a convenient manner for tabulating and calculating data obtained with the gas meter method. We have found that time and errors are prevented by well planned forms.

Precautions:

1. It is necessary to fill and empty the carbon dioxide absorber after about 20 minutes of actual absorption. The 30% KOH solution should be made up fresh after approximately 100 determinations have been made.

2. The apparatus should be checked regularly to make certain all pipe and hose connections are air-tight. Leaks are best repaired by replacing old connections, and liberal use of hose clamps. See Attachment 2 for details of checking for leaks.

3. The water vapor saturator needs filling and emptying only once a day in winter, twice a day in summer.

4. Be certain that the hard rubber plug in the upper vent in the CO_2 absorber is firmly in place before beginning a test.

5. Rubber mouthpieces and nose clips should be thoroughly washed and rinsed. Sterilization with 70% alcohol after washing is standard practice.

6. Double check all meter readings. The commonest errors in our experience are inaccuracies at the point where a needle is almost on a whole number. Judgment is required to decide if the true reading is above or below the whole number. This can be established by reading the next dial beyond the doubtful one.

7. Be sure after a day's run to leave the KOH absorber unit full of water, after emptying out the KOH into a 3-gallon tin can. This must be done to dissolve out K_2CO_3 and $KHCO_3$.

8. Use great caution not to spill 30% KOH. It is very corrosive. Use dishpans at all times to catch possible leakage.

Attachment 1: 30% KOH for Gas Meters

Principle: To make up large volumes of 30% KOH with the least danger.

Equipment:

1. Two three-gallon metal gasoline cans, wide mouth spout, plastic lined. Label one TAP WATER, the other 30% KOH.

2. Solid rubber stoppers to fit.

3. Large measuring cylinder.

4. Large plastic funnel.

5. Two large dishpans.

Supplies:

1. KOH, USP, pellets, in 5-lb bottles (i.e., 2.2 kg).

2. Tap water.

Procedure:

1. Into can marked 30% KOH pour 7.3 liters of cold tap water.

2. Place this can in sink and fill basin with cold water almost to top. (This step insures against over-heating, with danger of splashing.)

3. Make sure KOH pellets are all freely movable in bottle by shaking vigorously if necessary.

4. Place plastic funnel in 30% KOH can's mouth, and pour in 5 lbs of KOH pellets, adjusting stream of pellets so that they do not clog the funnel.

5. After 5 lbs of KOH pellets are poured in, remove funnel, rinse in tap water, and install rubber stopper firmly in can's mouth.

6. To dissolve, grasp can by neck and base, lift from water and swirl gently for a few seconds. Repeat periodically until solution is certainly complete.

7. If water in sink basin becomes warm, replace with cold water.

8. PRECAUTION: after each swirling, release pressure in can by removing stopper, and then replacing. If this is not done, there is some danger of steam and hot KOH blowing out the stopper.

9. After can has cooled to room temperature, it is ready for use in gasmeters' absorber. ALWAYS store the can in a large dishpan, in order to catch possible leakage.

Attachment 2: Calibration of Gasmeter Setup

A. Checking for Leaks

Principle: The whole circuit must be free from leakage of gas if valid data are to be obtained. Leakage is tested against a water manometer set at about 30 mm Hg (12 inches water).

Apparatus:

1. Bicycle or football pump.

2. Water manometer allowing at least 12 inches of pressure, fitted with a one-holed rubber stopper to go into outlet of M_3, and a sliding scale made from graph paper.

3. A series of #4, 5, and 6 one-holed rubber stoppers, fitted with 1/4-inch glass tubing and six inches of rubber tubing.

4. Pinch clamps for above.

5. Two 4-inch lengths of 1-inch pipe for connectors.

Procedure:

1. First test the setup without the Douglas valve. Remove the whole valve, replace with a piece of connector pipe, and clamp securely. Turn 3-way taps to convert M_1 with M_2, and M_2 with KOH absorber.

2. Install manometer in outlet of M_3.

3. Remove clamp at outlet of water saturator and install a rubber stopper with glass tube and rubber tube.

4. Pump air until water manometer is at about one foot of hydrostatic pressure. Clamp off rubber tube.

5. Wait 1 minute, set sliding scale at a particular cross bar and read after one minute. Leakage will be detected by a steady drop in the water level.

6. If there is no leakage, install Douglas valve in its proper place, place a rubber stopper in mouthpiece, clamp securely and immerse in a pan of water. Pump in air at water saturator to one foot of hydrostatic pressure. Look for bubbles. If leakage is detected, remove valve, dismantle, check all fittings and correct the leakage.

7. If leakage is detected in the main circuit as a whole, it will be necessary to dismantle the connections, and check at each point where there can be a leak. Pieces of corrugated hose are prone to develop pinhole leaks at the joint between the heavy end and the corrugated part. If leakage in a corrugated tube is suspected, remove the hose, fit with a solid stopper, immerse in a pan of water, and blow. Bubbles will betray pinhole leaks. Incompetent corrugated hose should be replaced, because it cannot be repaired successfully.

B. Determination of Meter Correction Factors

Principle: In general, the gasmeters do not agree exactly with the absolute value as determined by a Tissot tank. With the gasmeter setup it is necessary to determine for each of the three meters its own correction factor, when they are in use in the gasmeter setup.

Procedure:

1. Connect the inlet of a Tissot tank to the outlet of M_3.
2. Bypass the KOH absorber unit by connecting M_2 outlet directly to M_3 inlet.
3. Attach a Douglas valve so that the subject breathes out of water saturator and into the inlet of M_1, through a 3-way tap that can disconnect subject before inlet of M_1.
4. Connect outlet of M_1 with inlet of M_2.
5. Check setup for leakage, using water manometer as described in A above.
6. Have subject breathe through machine for five minutes while Tissot tank is flushed three times.
7. Turn tap at M_1 and M_2 inlets to outside air, and turn Tissot inlet tap to outside air.
8. Take initial M_1, M_2, and M_3 and Tissot readings.
9. Turn M_1 and M_2 inlet tap and Tissot inlet tap simultaneously at the end of a normal expiration.
10. Let subject breathe 10 minutes or until Tissot tank is 2/3 full.
11. During first minute and last two minutes, read M_1, M_2, and M_3 temperatures.
12. At minute 10 (approximately) turn M_1 inlet tap and Tissot inlet tap to outside air at the end of a normal expiration.
13. Read M_1, M_2, M_3 volumes and Tissot volume and temperature.
14. Read barometer.
15. Repeat the whole procedure in order to obtain duplicates.

Calculations:

1. Take average temperature for M_1, M_2, and M_3 respectively.
2. Reduce volumes to STP.
3. Reduce Tissot volume to STP, including Tissot conversion factor.

4. M_1, M_2, M_3 correction factor is that factor which multiplies M_1, M_2, M_3 to produce true Tissot volume, i.e.;

   M_1, M_2, M_3 correction = (Tissot volume, STP)/(M_1 or M_2 or M_3, STP)

5. Use four significant figures. A usual value is 0.9900 to 1.000.

C. Determination of O_2 and CO_2 Factors

Principle: By using Douglas bags and actual analysis of oxygen consumption and carbon dioxide production, correction factors are computed for the 3-gasmeter setup.

Equipment:

1. Three-gasmeter setup, complete.

2. Scholander gas analyzer, complete.

3. Syringes, 50 and 100 ml for gas samples, with 3-way stopcocks and connecting rubber tubing.

4. Two Douglas bags, each with large bore 3-way tap, connecting rubber tubing, and hose clamps. The outlet sampler of each bag is fitted with a 3-way syringe stopcock.

Procedure:

1. Two runs are required, an oxygen run and a carbon dioxide run.

2. Allow a subject to rest quietly for about 15 minutes.

3. For oxygen consumption, at the outlet of M_3, install a Douglas bag.

4. Make a regular 10-minute run with the gasmeters, collecting expired air in Douglas bag.

5. Analyze the % O_2, N_2, and CO_2 in the Douglas bag.

6. For carbon dioxide production, install a Douglas bag between M_2 and CO_2 absorber. Arrange two sets of 3-way taps so subject can breathe through M_2 into bag, and subsequently gas from bag can be pressed through CO_2 absorber and M_3 without going back through M_2.

7. Make a regular run, subject breathing into bag but not from there through KOH absorber and M_3.

8. Take duplicate syringe samples from sidearm of Douglas bag recording volume of all air removed from bag.

9. Turn taps so bag contents will go through KOH absorber and M_3.

10. Read M_3 volume and temperature.

11. Force bag contents quantitatively through absorber and M_3.

12. Again read M_3 volume and temperature.

13. Add to M_3 the volume of gas previously removed for analysis.

Calculations:

1. Reduce all volumes to STP, meter corrected.

2. O_2 consumption, true = (M_1, corrected x 0.2093) - (M_3, corrected x % O_2 in bag at M_3 ÷ 100)

3. CO_2 production, true = (M_2, corrected x % CO_2 in bag at M_2 ÷ 100)

4. O_2 correction factor is that number which multiplies M_3 to give true O_2 consumption.

   $M_1 - M_3 = O_2$ consumption

   M_3 true = M_1 - (O_2 consumption from bag)

   M_3 meter method = M_1 - (O_2 consumption meter method)

   O_2 correction factor = (M_3 true) / (M_3 meter method)

5. CO_2 correction factor is that number which multiplies M_3 to give true CO_2 production.

   $M_2 - M_3 = CO_2$ production

   M_3 true = M_2 - (CO_2 production from bag)

   M_3 meter method = M_2 - (CO_2 production meter method)

   CO_2 correction factor = (M_3 true) / (M_3 meter method)

Precautions:

1. If the bag at M_3 outlet contains more than 0.1 % CO_2, the absorber is inefficient and must be corrected.

2. Scholander checks with outdoor air must be accurate if this method is to mean anything.

3. Take extreme precautions in sampling. Small errors will vitiate all the correction factors.

TABLE AI.12

SAMPLE PAGE
RESTING METABOLISM - DATA AND CALCULATIONS

SUBJECT #: 1 NAME: John Doe

DATE: Apr. 2, 1955 TIME: 10:40 BAROMETER: 742 OPERATOR: C.M.

HEIGHT: 5'9" WEIGHT: 145 lb. SURFACE AREA: 1.78

UNIT #: 1 CORRECTIONS: M_1 0.993 M_2 0.991

M_3 0.998 M_3 CO_2 0.991 M_3 0.991

RUN #1 START 1040 0" END 1050 0". Mins = 10.00

	M_1 Reading	T	M_2 Reading	T	M_3 Reading	T
End	1919.135	26.5	1415.198	26.0	1844.392	25.9
Start	1854.302	26.4	1351.450	25.9	1782.477	25.9
Diff.	64.833	26.5	63.748	25.9	61.915	25.9
STP	55.627	0.858	54.951	0.862	53.371	0.862
Meter Corr.	55.238		54.456		53.264	
M_3 Corr	52.785		52.785		------	
Diff.	2.453		1.671		------	

O_2 ml/min 245 CO_2 ml/min 167 RQ 0.68 PV L/min 5.446

Time for 10 expirations: 48" Resp./min: 13

RUN #2	START		END		MINS	
	M_1 Reading	T	M_2 Reading	T	M_3 Reading	T
End						
Start						
Diff.						
STP						
Meter Corr.						
M_3 Corr.						
Diff.						

Q_2 ml/min ______ CO_2 ml/min ______ RQ ______ PV L/min ______

Secs. for 10 expirations: Resp./min:

H. THE 1953 MINNESOTA SKIN CALIPER*

1. Description

This is a slide caliper graduated in mm with a vernier to permit reading to 0.1 mm. The upper scale is graduated in inches, with markings at each 1/16 in., and has a vernier allowing readings in 1/60 in. The scale readings are 20.0 mm greater than the actual distance between the jaws when properly used, so this value must be subtracted from every reading. E.g., if the reading is 28.8, then the true space between jaws is 8.8 mm.

A basic feature of this caliper is that all readings are made at constant, known pressure. This is assured by the spring arm. In use, the caliper is applied to the skin so that it is substantially flat on the surface from which the skinfold is to be lifted. A fold of skin is lifted with the fingers of the left hand and the slider pushed towards the closed position with the thumb of the right hand. Make sure that the lock (the toggle arm projecting down about an inch beyond the thumb wheel) is free before attempting to slide the movable arm. Note that this caliper is for right hand use; it could be used with the left hand but this would be awkward. Measure the fold at least 1 cm away from the site of finger-thumb pressure. In general it is recommended that the measurement at each site be repeated three times and the median value be recorded as final.

The correct reading of the caliper is obtained when the brass pointer hand points to the mark at the top. Since the pointer gives a magnification of about three times, no great care is needed to assure that the pointer is very exactly on the mark, i.e., if the pointer is off the mark by 1 mm, the jaws are within about 0.3 mm of the precise setting. The reading may be made directly or, if preferred, the caliper may be locked by pushing the toggle arm and the reading made at leisure after slipping the caliper off the skinfold.

This caliper has an effective jaw face, in contact with the skin, of 25 mm^2 and, as set here in the laboratory the total pressure is 250 gm when the brass pointer is at the zero mark. This means a pressure of 10.0 gm per/mm^2 and this is suitable for most purposes. Different pressures, however, may be readily provided by changing the tension of the spring. In order to do this, or to recalibrate, the slider should be moved to a wide open jaw position and then firmly clamped so that the scale is vertical. From a thread or wire fastened through the hole in the brass hinge body

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* Based on information received from Laboratory of Physiological Hygiene (Dr. A. Keys, Director), University of Minnesota and on Army Medical Nutrition Laboratory Report No. 113 (31 Aug. 1953).

(just above the jaw proper) the desired total weight is suspended. Then the axle pin is released by loosening the set screw on the lower back side of the hinge and the axle pin is turned with a screw driver until the weight appears to balance the brass pointer at the zero mark. The set screw is then firmly tightened and the new setting checked by repeated changes of the pull of the weight; on the average the pointer should return to the zero mark when the weight is allowed to exert its effect. If need be, the process can be repeated until the exact pressure setting is attained.

An Allen wrench for the set screw is enclosed. The system is sensitive to 20 gm or so, ordinarily. As supplied, the slide and toggle lock may be rather stiff but these will loosen with use. If very many measurements are being made at a time, a thumb stall or the thumb cut out of an old glove will protect the skin of the operator's right thumb.

2. Sites for Skinfold Measurement

The thickness of the subcutaneous fat layer varies widely in different locations on the body. The distribution differs in different individuals, in the two sexes, and at different ages. In adults the greatest thickness is on the trunk and least on the dorsum of the hand and the feet. In children the fat thickness on the trunk is usually less than on the upper arms and legs. A complete picture of the subcutaneous fat would require measurements at many sites - Edwards in London uses over 50 sites - but a useful indication of the total fat can be obtained with measurements at as few as three sites and significance can be attached to the finding at a single site.

For all sites the procedure is to pinch and lift up a large fold and to apply the caliper so the jaws will close <u>above</u> the plane of the surrounding skin but well below the top of the fold. The caliper should close on the fold so the sides of the fold caught in the jaws are parallel, or nearly so, when the measurement is made. Do not try to measure the thickness at the very bottom of the fold.

As supplied the calipers are set at about 10 gm per/mm^2 when the brass pointer is at zero and no serious error will result if the pressure is anywhere between 8 and 12 gm/mm^2. If other pressures are used the pressure should be recorded and reported with the skinfold data. We recommend that the pressure never be less than about 6 gm/mm^2. At pressures of 25 or 30 gm/mm^2, or more, there may be some complaints of pinching discomfort.

The following sites are to be used for measurement:

a. <u>Above right nipple.</u> A transverse skinfold half-way between the right nipple and the apex of the right anterior axillary fold.

b. <u>Dorsal aspect of right upper arm.</u> A longitudinal skinfold midway between the olecranon and the hand of the humerus on the dorsal surface of the right brachium.

c. Right of umbilicus. A transverse fold one-third of the distance from the navel to the right mid-lateral line.

3. Calibration

The caliper has been calibrated so that as it left the manufacturing laboratory it exerted a pressure of 10 gm per square millimeter of jaw surface, or a total pressure of 250 gm, when the indicating arm points at the central mark (jaw faces parallel). In order to check the calibration a 50-gm brass weight and an extension arm are supplied. Calibration requires only a few minutes.

The procedure is as follows:

1) Remove the brass screw from the top of the movable jaw and use it to attach the extension arm to the movable jaw. The small notch near the end of the extension arm should face the fixed jaw.

2) Fasten the caliper in a clamp or vise so that the graduated scale is vertical, with the jaw portion at the top, and the slider cannot slip down. Do not squeeze the slider in the clamp.

3) Hang the brass weight from the notch on the extension arm and observe whether the natural position of rest of the pointer is at the "zero" mark. If on repeated displacements of the pointer arm it tends to return to within about 1 mm of the zero mark the total tension is very close to 250 gm.

4) If the setting is off, or if it is desired to change to a different tension, adjustment is made as indicated in the main instructions for the caliper.

I. INSTRUCTIONS FOR OPERATION OF THE SARGENT THERMISTOR THERMOMETER*

1. Description

The Sargent Thermistor Thermometer comprises a Wheatstone bridge circuit, powered by a self-contained dry cell. One arm of the bridge consists of a temperature sensitive Thermistor; the opposite arm consists of a stepwise resistance (RANGE switch) and a continuously variable resistance (ZERO adjustment) for balancing. A sensitive microammeter serves to indicate degree of bridge unbalance. A variable resistance in series with the meter (SPAN adjustment) controls meter sensitivity. Over the temperature ranges served by this instrument, the unbalance current is a linear function of the temperature of the Thermistor within the accuracy of measurement. The total span of temperatures served by the instrument in any given position of the RANGE switch depends both upon this position and the type of Thermometric Element used. At room temperatures and below (lower positions on the RANGE switch) the meter scale represents a minimum of approximately 10°C when low resistance elements are used (Catalog Nos. S-82075, S-81620, and S-81630); at 50°C it represents approximately 15°C; and at near 100°C, 40°C. High resistance elements (Catalog Nos. S-81621, and S-81631) may be used above 80°C to provide a minimum scale of 10 or 15°C near 100°C operating temperature. Total range of application is from -10°C to slightly above 200°C with an accuracy on the order of 0.1°C, using both types of element. Note that selection of the proper Thermistor element of each resistance class will depend upon physical aspects of the application.

2. Procedure

1. Plug the selected Thermometric Element into the receptacle at the lower front of the instrument panel. Bring the element to the lowest temperature desired on the scale. This may be done accurately by means of constant boiling mixtures, constant melting solids, or perhaps most conveniently by comparison with a standard mercury-in-glass thermometer. In the latter case, the large thermal lag of the mercury-in-glass system relative to that of the Thermistor should be noted. For convenience in subsequent interpolation of the meter scale, the lower temperature selected should be an integral number of degrees on the conventional temperature scale.

2. Turn the OPERATION switch to SAFE and adjust the RANGE switch to approximately zero current on the meter.

3. Turn the OPERATION switch to STAND., remove the cap from the STAND. control and adjust the meter current to 20 microamperes. Replace cap. This operation ensures constant bridge voltage and consequent maintenance of calibration with time, and should be repeated as necessary to compensate for battery aging.

* Quoted from material included with the instrument (E. H. Sargent Co., Chicago).

4. Turn the OPERATION switch to NORMAL. Remove the cap from the ZERO control and complete adjustment of meter current to zero.

5. Bring the temperature of the Thermometric Element to the highest temperature desired on the calibrated scale. Remove the cap from SPAN control and adjust the meter reading to 20 microamperes. Replace cap. Note that if an integral temperature figure is set at the maximum meter reading subsequent interpolation of temperatures is facilitated.

Calibration of the meter scale is now completed and meter readings for unknown temperatures may be converted to degrees by assuming a linear relation between current and temperature.

3. Servicing

The instrument should require little maintenance other than occasional replacement of the dry cell. This is accomplished by removing the front panel from the case. The battery is mounted inside the case and connected to the panel by means of a short cable and polarized plug. For replacement battery, see Catalog No. S-30858.

4. Sargent Thermometric Element

This Thermometric Element is designed for use with any of the Sargent thermistor-actuated instruments for controlling, indicating, or recording temperature. It consists of a sealed-in-glass thermistor (a semi-conductor characterized by a high negative coefficient of resistance) mounted for easy connection to the instrument and for easy assembly into all types of apparatus by the expedient of insertion through a cork or rubber stopper.

Maximum operating temperature for this element is approximately 200°C, a constructional limit. Electrically, however, its characteristics are such that most useful sensitivity is obtained below 100°C.

Reasonable care should be exercised in handling the element due to the fragility of the projecting tip. The protective shield in which it is shipped should be retained for use whenever the element is stored.

J. CALCULATION OF NUTRIENT BALANCES

General Equation. The general equation for all nutrient balances was the conventional one: Balance = Intake - Output.

All food and liquid consumption was recorded continuously for all subjects. Intake was calculated from the known weight of food or liquid consumed per day, and the composition of the food or liquid as determined by direct analysis, or as estimated from the most trustworthy book values, especially those of the Quartermaster Food and Container Institute.

The output of a nutrient is the sum of loss by way of urine, feces, skin (especially sweat in this study), and from miscellaneous sources such as venipuncture, hair and epidermis, and vomitus. Urine and feces were collected continuously from all subjects, appropriate periods were chosen, the urine and feces were pooled separately, and aliquots were frozen for subsequent analysis.

Aliquoting of Urine. The subjects carried gallon cans at all times. On a typical day, they turned in the can of the previous 24 hours at 0530, and received a new one for the coming day. For each subject there was a gallon jug of brown glass, kept in a refrigerator, and containing 10 ml of glacial acetic, the purpose of which was to keep the urine acid enough to prevent precipitation of calcium and phosphate. From each day's sample, 10% was measured and poured into the subject's jug. At the end of the metabolic period, distilled water was added in an amount which would bring the daily volume, as diluted to 700 ml. Thus, all analytical data in terms of units per 100 ml need to be multiplied by 7 in order to give the mean daily urinary excretion of the nutrient in question. Tables AI.13-AI.16 contain these factors for each subject and period.

In some instances, the factors are not exactly 7, owing to variations in time of collection, or to the final volumes employed. On days of the water diuresis test, urine was not taken for the pool, because of the possible "washing out" of nutrients. On days of the three-hour test and the heat acclimatization test, the time of the daily collection was corrected by an amount equal to the time involved in the tests.

Aliquoting of Feces. Each bowel movement of every subject was collected in a labeled one-pint cardboard, paraffin-lined container. These were picked up three or four times a day and stored in a reefer truck, maintained at 35°F. At appropriate times, carmine markers were administered to each subject, and the appearance of carmine in the feces marked the end of each metabolic period.

For each subject, the feces for a given metabolic period were weighed and ground according to the procedure of Johnson, Pandazi, and Sargent (1955). A "fecal factor" was calculated for each subject for each period. The equation was:

$$(\text{gm nutrient excreted per day}) = \frac{(\text{gm feces} + \text{ml water added})}{(\text{gm feces}) \times 100} \times (\text{gm nutrient}/100 \text{ ml of homogenate})$$

TABLE AI.13
URINE 7-DAY POOL FACTORS: FLIGHT 1
(liters diluted urine/day)

Subject	PRE I	PRE II	EXP I	EXP II	REC I	REC II
1	8	7	7	6.80	5.2	7
2	7	7	9.77	----	---	7
3	7	7	6.96	6.80	7	7
4	7	7	6.5	6.80	7	7
5	7	7	7	----	---	7
6	7	7	7	6.80	7	7
7	7	7	7	6.80	7	7
8	7	7	7	6.80	7	7
9	7	7	7	6.80	7	7
10	7	7	7	6.80	7	7
11	7	7	7	6.80	7	7
12	7	7	7	6.80	7	7
13	7	7	7	----	---	-
14	7	7	7	6.80	7	7
15	7	7	7	6.80	7	7
16	7	7	7	10.00	7	7
17	7	7	7	6.80	7	7
18	7	7	7	6.80	7	7
19	7	7	7	6.80	7	7
20	7	7	7	----	---	-
21	7	7	7	6.80	7	7
22	7	7	7	6.80	7	7
90	7	7	7	6.80	7	7
91	7	7	7	6.80	7	7
92	7	7	7	6.80	7.50	7

TABLE AI.14
URINE 7-DAY POOL FACTORS: FLIGHT 2
(liters of diluted urine/day)

Subject	PRE I	PRE II	EXP I	EXP II	REC I	REC II
23	7	7	7	6.98	7	7
24	7	7	7	6.98	7	7
25	7	7	7	6.98	7	7
26	7	7.5	7	6.98	7	7
27	7	7	7	6.98	7	7
28	7	7	7	6.98	7	7

TABLE AI.14 (Contd)

Subject	PRE I	PRE II	EXP I	EXP II	REC I	REC II
29	7	7	7	6.98	7	7
30	---*	7	7	6.98	7	7
31	7	7	7.12	6.98	7	7
32	7	7	7	6.98	7	7
33	7	7	7	6.98	7	7
34	7	7	8.75	6.98	7	7
35	7	7	7	6.98	7.50	7
36	7	7	7	6.98	7	7
37	7	7	7	6.98	7	7
38	7	7	7	6.98	7	7
39	7	7	7	6.98	7	---
40	7	7	7	6.98	7	7
41	7	7	7.19	---	---	7
42	8.75	7	7	6.98	7	7
43	7	7	7	6.98	7	7
44	7	7	7	6.98	7	7
94	7	7	7	6.98	7	7
95	7	7	7	6.98	7	7
102	---	---	---	6.98	7	7
93	7*	---	---	---	---	---

*93 became 30 PRE II

TABLE AI.15

URINE 7-DAY POOL FACTORS: FLIGHT 3
(liters of diluted urine/day)

Subject	PRE I	PRE II	EXP I	EXP II	REC I	REC II
45	7	7	7	7	7	7
46	7	7	7	7	7	7
47	7	7	7	7	7	7
48	7	7	7	7	7	7
49	7	7	7	7	7	7
50	7	7	7	7	7	7
51	7	7	7	7	7	7
52	7	7	7	7	7	7
53	7	7	7	7	7	7
54	7	7	7	7	7	7
55	7	7	7	7	7	7
56	7	7	7	7	7	7
57	7	7	7	7	7	7

TABLE AI.15 (Contd)

Subject	PRE I	PRE II	EXP I	EXP II	REC I	REC II
58	7	7	7	7	7	7
59	-	-	7.64	7	7	7
60	7	7	7	7	7	7
61	7	7	7	7	7	7
62	7	7	7	7	7	7
63	7	7	7	7	7	7
64	7	7	7	7	7	7
65	7	7	7	7	7.50	7
66	7	7	7	7	7	7
96	7	7	7	7	7	7
97	7	7	7	7	7	7
98	7	7	7	7	7	7

TABLE AI.16

URINE 7-DAY POOL FACTORS: FLIGHT 4
(liters of diluted urine/day)

Subject	PRE I	PRE II	EXP I	EXP II	REC I	REC II
67	7	7	7	6.98	7	7
68	7	7	7	6.98	7	7
69	7	7	7.57	6.98	7	7
70	7	7	7.57	6.98	7	7
71	7	7	7.57	6.98	7	7
72	7	7	7.57	6.98	7	7
73	7	7	7.57	6.98	7	-
74	7	7	6.94/7	6.98	7	7
75	7	7	7.57	6.98	7	7
76	7	7	7.40/8.78	6.98	7	7
77	7	7	6.40	----	-	-
78	7	7	7.57	6.98	7	7
79	7	7.39	7.57	6.98	7	7
80	7	7	7.57	6.98	7	7
81	7	7	7.57	6.98	7	7
82	7	11.67	7.57	----	-	-
83	7	7	7.57	6.98	7	7
84	7	7	7.57	6.98	7	7
85	7	7	7.57	6.98	7	7
86	11.66	8.75	7.57	6.98	7	7
87	7	7	7.02/7.13	----	-	7
88	7	7	6.99/7.60	----	-	-
99	7	7	7.57	7.04	7	7
100	7	7	7.57	7.04	7	7
101	7	7	7.57	7.04	7	7

Fecal factors for all subjects and periods are listed in Tables AI.17 - AI.20. They enable analytical data to be processed simply, for the analytical data are transformed to output per day by a single multiplication.

The periods EXP II and REC I posed a special arithmetical problem, because carmine markers were administered at the end of EXP I and at the end of REC I, but not at the end of EXP II. To decide which fecal specimens should be included in the pool was to some extent a matter of individual judgment, and all the factors concerning each individual subject had to be considered. In general, it was assumed that the first bowel movement that came out after the end of EXP I represented the total excretion for EXP II, and all the rest up to the end of REC I represented REC I. In the case of the FRA's, the whole of EXP II and REC II could be considered a period of "steady state" and it was calculated accordingly on the assumption that the mean daily fecal excretion of these subjects would be constant during those seven days.

Subjects Included in Calculations of Various Regimens and Periods. For one or another of a variety of reasons, not all subjects completed all phases of the study. These reasons have been discussed fully in Volume I of this report. In order to tabulate all data in a systematic manner, tables were constructed of those subjects in each regimen and each period whose balance data were included in the ultimate averages (Tables AI.21 - AI.23). In general, the major criterion for inclusion was the state of health of the subject during a particular period. If he completed the period on a particular regimen, he was included in that period, provided he was considered healthy by his physician. Thus, in P I and P II, all subjects could be included. In EXP I, Subjects 2, 40, 41, 74, 58, 54, and 77 dropped out of their assigned regimens. In EXP II, Subjects 3, 4, 5, 13, 16, 39, 20, 31, 87, and 88 also dropped out. These subjects were transferred to FRA if they had not been evacuated from the project entirely. In REC II, there was a substantial increase in FRA's for the reason stated above. Metabolic collections were made on some subjects who were in Sick Bay and not on their regular regimens. These are included for completeness as "special balances," but will not be used for computing the means for regimens and periods.

TABLE AI.17

FECAL FACTORS: FLIGHT 1
(ml of homogenate/day)

Subject No.	PRE I	PRE II	EXP I	EXP II	REC I	REC II
1	980	943	902	0	1443	1202
2	974	933	---	---	----	2174
3	987	992	908	0	1341	1202
4	979	942	918	595*	1930*	1246

TABLE AI.17 (Contd)

Subject No.	PRE I	PRE II	EXP I	EXP II	REC I	REC II
5	1004	950	0	----	----	2349
6	1075	966	287*	287*	1422*	1171
7	1070	1007	939*	939*	1464	1292
8	1038	957	940	861*	1780*	1198
9	1085	986	939	1167*	1750*	1290
10	969	965	922*	922*	1356	1221
11	1079	1004	929*	929	1351	1195
12	1025	917	982*	982*	1380	1198
13	972	953	920	----	----	----
14	1039	1066	981*	981*	1347	1260
15	1026	979	923*	923*	(**)	----
16	1029	977	951	----	----	----
17	963	958	965*	965*	1376	1161
18	973	948	935*	935*	1341	1250
19	1003	951	962	632*	1907*	1660
20	979	971	975	----	----	----
21	1007	946	1019	815*	1740*	1207
22	998	939	977	670*	1870*	1221
90	1059	1073	1057	1398*	1398*	1274
91	960	984	988	1347*	1347*	1174
92	1011	1015	1011	1394*	1394*	1289

* Same specimen
-- Subject not present
** Assume average of others on regimen

TABLE AI.18

FECAL FACTORS: FLIGHT 2
(ml of homogenate/day)

Subject No.	PRE I	PRE II	EXP I	EXP II	REC I	REC II
23	1003	935	914*	914*	1393	1356
24	1013	920	914*	914*	1339	----
25	1085	955	917	588*	2040*	1324
26	1059	964	903*	903*	1366	1278
27	1054	924	948*	948*	1409	1225
28	1025	1001	906*	906*	1388	1258
29	1055	932	923*	923*	1349	1156
30	----**	954	966	966*	1389	1220
31	1007	954	1335	984*	984*	1196
32	1012	1004	924	455*	1960*	1138

TABLE AI.18 (Contd)

Subject No.	PRE I	PRE II	EXP I	EXP II	REC I	REC II
33	1087	1014	954	876*	1710*	1245
34	994	955	947	857*	1685*	1224
35	1018	907	952*	952*	1350	1228
36	977	995	922*	922*	1339	1236
37	991	901	959	852*	1720*	1183
38	996	903	917	400*	1895*	1226
39	1024	942	970	406*	1975*	----
40	980	976	1320	1044*	1044*	1223
41	1069	1643	----	----	----	2266
42	1818	991	969*	969*	1397	1218
43	1004	944	1017	697*	1865*	1252
44	1108	982	1018	675*	1900*	1218
93	1024**	----	----	----	----	----
94	1146	1085	1063	1701*	1701*	1363
95	984	937	1010	1115*	1115*	1156
102	----	----	----	1021*	1021*	1173

* Same specimen
-- Subject not present μ
** Subject became 30 in PRE II

TABLE AI.19

FECAL FACTORS: FLIGHT 3
(ml of homogenate/day)

Subject No.	PRE I	PRE II	EXP I	EXP II	REC I	REC II
45	1047	925	936*	936*	1381	1240
46	1032	930	915*	915*	1376	1294
47	985	966	913*	913*	1322	1134
48	1061	1007	938*	938*	1379	1314
49	1011	943	133*	133*	1950*	1199
50	1036	958	15*	15*	2222*	1200
51	1054	918	940*	940*	1402	1145
52	1091	955	934*	934*	1350	1328
53	987	961	928	478*	1969*	1161
54	1017	994	941	293*	2180*	1187
55	961	997	920*	920*	1433	1160
56	981	932	1004*	1004*	1421	1275
57	971	972	916*	916*	1289	1110
58	981	1006	1395	1085*	1085*	1247

TABLE AI.19 (Contd)

Subject No.	PRE I	II	EXP I	II	REC I	II
59	----	----	1050	1035*	1612*	1179
60	996	1010	958*	958*	1325	1148
61	1048	1015	953	666*	1935*	1202
62	1054	986	951*	951*	1356	1194
63	996	962	912	409*	2090*	1225
64	1027	1035	930*	930*	1385	1252
65	1092	1081	997	812*	1778*	1204
66	1051	1042	995	681*	1875*	1214
96	997	1028	1014	1389*	1389*	1168
97	949	974	987	1354*	1354*	1153
98	1040	1071	981	1353*	1353*	1240

* Same specimen
-- Subject not present

TABLE AI.20

FECAL FACTORS: FLIGHT 4
(ml of homogenate/day)

Subject No.	I	II	I	II	I	II
67	1080	954	0*	0*	1155*	1287
68	1021	922	950	1425*	1425*	4637
69	1052	1012	918*	918*	1482	1234
70	1025	1022	910*	910*	1374	1297
71	1027	966	911*	911*	1391	1246
72	1013	961	102*	102*	2120*	1266
73	995	1024	978*	978*	2235	----
74	978	968	930*	930*	1376	1293
75	952	970	937*	937*	1340	1165
76	1030	960	949*	949*	1386	1211
77	1028	977	----	----	----	----
78	1015	1056	949	493*	1970*	1353
79	1052	981	955*	955*	1369	1212
80	1038	943	928*	928*	1372	1181
81	1060	997	937	556*	1970*	1197
82	1362	935	939	----	----	2293
83	1053	979	942	705*	2040*	1244
84	1081	953	963*	963*	1388	1240
85	1036	1042	1012	555*	2023*	1329
86	1844	1062	999*	999*	1397	1225

TABLE AI.20 (Contd)

Subject No.	PRE I	PRE II	EXP I	EXP II	REC I	REC II
87	1054	955	2342	----	----	2196
88	1005	1045	1336	----	----	----
99	1042	1022	1063	1416*	1416*	1162
100	954	991	996	1361*	1361*	1196
101	1085	1104	1038	1422*	1422*	1131

* Same specimen

-- Subject not present

TABLE AI.21

BALANCE CALCULATIONS: SUBJECTS INCLUDED IN VARIOUS REGIMENS AND PERIODS (Hard Work)

Experimental Regimen		PRE I	PRE II	EXP I	EXP II	REC I	REC II
ST 0	U	1, 2, 3, 4	1, 2, 3, 4	1, 3, 4	1	1, 3, 4	1, 3, 4
	L	23, 24 25, 26	23, 24 25, 26	23, 24 25, 26	23, 24 25, 26	23, 24 25, 26	23, 25 26
0/100/0	U	5, 6	5, 6	5, 6	6	6	6
1000	L	27, 28	27, 28	27, 28	27, 28	27, 28	27, 28
0/100/0	U	7, 8	7, 8	7, 8	7, 8	7, 8	7, 8
2000	L	29	29, 30	29, 30	29, 30	29, 30	29, 30
2/20/78	U	13, 14	13, 14	13, 14	14	14	14
1000	L	35, 36	35, 36	35, 36	35, 36	35 36	35, 36
2/20/78	U	15, 16	15, 16	15, 16	15	15*	--
2000	L	37, 38	37, 38	37, 38	37, 38	37, 38	37, 38
15/52/33	U	17, 18	17, 18	17, 18	17, 18	17, 18	17, 18
1000	L	39, 40	39, 40	39	--	--	--
15/52/33	U	19, 20	19, 20	19, 20	19	19	19
2000	L	41, 42	41, 42	42	42	42	42
15/52/33	U	21, 22	21, 22	21, 22	21, 22	21, 22	21, 22
3000	L	43, 44	43, 44	43, 44	43, 44	43, 44	43, 44
30/0/70	U	9, 10	9, 10	9, 10	9, 10	9, 10	9, 10
1000	L	31, 32	31, 32	31, 32	32	32	32
30/0/70	U	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12
2000	L	33, 34	33, 34	33, 34	33, 34	33, 34	33, 34

* Assume average value for other C_2

TABLE AI.22

BALANCE CALCULATIONS: SUBJECTS INCLUDED IN VARIOUS REGIMENS AND PERIODS
(Light Work)

Experimental Regimen		PRE I	PRE II	EXP I	EXP II	REC I	REC II
ST 0	U	45, 46, 47, 48, 54	45, 46, 47, 48, 54	45, 46, 47, 48, 54	45, 46, 47, 48, 54	45, 46, 47, 48, 54	45, 46, 47, 48, 54
	L	67, 68, 69, 70	67, 68, 69, 70	67, 68, 69, 70	67, 69	67, 68, 69, 70	67, 68, 69, 70
0/100/0	U	49, 50	49, 50	49, 50	49, 50	49, 50	49, 50
1000	L	71, 72	71, 72	71, 72	71, 72	71, 72	71, 72
0/100/0	U	51, 52	51, 52	51, 52, 74	51, 52, 74	51, 52	51, 52
2000	L	73, 74	73, 74	73	73	74	74
2/20/78	U	57, 58	57, 58	57	57	57	57
1000	L	79, 80	79, 80	79, 80	79, 80	79, 80	79, 80
2/20/78	U	60	60	59, 60	59, 60	59, 60	59, 60
2000	L	81, 82	81, 82	81, 82	81	81	81
15/52/33	U	61, 62	61, 62	61, 62	61, 62	61, 62	61, 62
1000	L	83, 84	83, 84	83, 84	83, 84	83, 84	83, 84
15/52/33	U	63, 64	63, 64	63, 64	63, 64	63, 64	63, 64
2000	L	85, 86	85, 86	85, 86	85, 86	85, 86	85, 86
15/52/33	U	65, 66	65, 66	65, 66	65, 66	65, 66	65, 66
3000	L	87, 88	87, 88	87, 88	---	---	---
30/0/70	U	53	53	53	53	53	53
1000	L	75, 76	75, 76	75, 76	75, 76	75, 76	75, 76
30/0/70	U	55, 56	55, 56	55, 56	55, 56	55, 56	55, 56
2000	L	77, 78	77, 78	78	78	78	78

TABLE AI.23

BALANCE CALCULATIONS: SUBJECTS INCLUDED IN VARIOUS REGIMENS AND PERIODS
(FRA's and Others)

Period	FRA's in Period
PRE I	90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101
PRE II	90, 91, 92, 94, 95, 96, 97, 98, 99, 100, 101
EXP I	90, 91, 92, 94, 95, 96, 97, 98, 99, 100, 101
EXP II	31, 40, 90, 91, 92, 94, 95, 96, 97, 98, 99, 100, 101, 102

TABLE AI.23 (Contd)

Period	FRA's in Period
REC I	31, 40, 58, 90, 91, 92, 94, 95, 96, 97, 98, 99, 100, 101, 102
REC II	2, 4, 31, 40, 41, 58, 90, 91, 92, 94, 95, 96, 97, 98, 99, 100, 101, 102

Period	Special Balances (Subject changed regimen)
PRE I	None
PRE II	None
EXP I	58
EXP II	3, 4, 39, 58, 68, 70
REC I	39, 73
REC II	87

K. SUBJECTS INCLUDED IN THREE-HOUR TEST TABULATIONS

Owing to a variety of causes, not all subjects were able to complete the six periods in the same groups to which they were originally assigned. Using this fact as the basic interim, we here constructed tables for each period showing which subjects would be included in each group (Tables AI.24-AI.26). If a subject was removed entirely from the study, his number disappears, e.g. 77. If a subject changed regimens, but remained in the study, his number will be found in the group to which he was transferred, e.g. 74. If a subject was rehabilitated by placing him on an unrestricted dietary regimen, he was considered an FRA, and his number will occur among those subjects, e.g. 31 and 40. Special three-hour tests were conducted on subjects whose condition demanded an abrupt cessation of the experimental regimen. In such cases the data are included in the category "Specials," e.g. Subject 41. In a few cases, identified by asterisks, the special three-hour test had to be incomplete, e.g. 80 and 82 in PRE II.

In all tabulations of the three-hour tests' manifold observations, the above tables will be used for purposes of averaging and charting the data according to the experimental regimens.

TABLE AI.24

SUBJECTS IN THREE-HOUR TESTS BY PERIODS AND REGIMENS
(Hard Work)

Experimental Regimen		PRE I	PRE II	EXP I	EXP II	REC I	REC II
ST O	U	1, 2, 3, 4	1, 2, 3, 4	1, 3, 4	1	1, 3, 4	1, 3, 4
	L	23, 24, 25, 26	23, 24, 25, 26	23, 24, 25, 26	23, 24, 25, 26	23, 24, 25, 26	23, 25, 26
0/100/0	U	5, 6	5, 6	5, 6	6	6	6
1000	L	27, 28	27, 28	27, 28	27, 28	27, 28	27, 28
0/100/0	U	7, 8	7, 8	7, 8	7, 8	7, 8	7, 8
2000	L	29	29, 30	29, 30	29, 30	29, 30	29, 30
2/20/78	U	13, 14	13, 14	13, 14	14	14	14
1000	L	35, 36	35, 36	35, 36	35, 36	35, 36	35, 36
2/20/78	U	15, 16	15, 16	15, 16	15	15	--
2000	L	37, 38	37, 38	37, 38	37, 38	37, 38	37, 38
15/52/33	U	17, 18	18	17, 18	17, 18	17, 18	17, 18
1000	L	39, 40	39	39	--	--	--
15/52/33	U	19, 20	19, 20	19, 20	19	19	19
2000	L	41, 42	41, 42	42	42	42	42
15/52/33	U	21, 22	21, 22	21, 22	21, 22	21, 22	21, 22
3000	L	43, 44	43, 44	43, 44	43, 44	43, 44	43, 44

TABLE AI.24 (Contd)

Experimental Regimen		PRE I	PRE II	EXP I	EXP II	REC I	REC II
30/0/70	U	9, 10	9, 10	9, 10	9, 10	9, 10	9, 10
1000	L	31, 32	31, 32	31, 32	32	32	32
30/0/70	U	11, 12	11, 12	11, 12	11, 12	11, 12	11, 12
2000	L	33, 34	33, 34	33, 34	33, 34	33, 34	33, 34

TABLE AI.25

SUBJECTS IN THREE-HOUR TESTS BY PERIODS AND REGIMENS
(Light Work)

Experimental Regimen		PRE I	PRE II	EXP I	EXP II	REC I	REC II
ST 0	U	45, 46, 47, 48, 54	45, 46, 47, 48, 54	45, 46, 47, 48, 54	45, 46, 47, 48, 54	45, 46, 47, 48, 54	45, 46, 47, 48, 54
	L	67, 68, 69, 70	67, 68, 69, 70	67, 68, 69, 70	67, 69	67, 68, 69, 70	67, 69, 70
0/100/0	U	49, 50	49, 50	49, 50	49, 50	49, 50	49, 50
1000	L	71, 72	71, 72	71, 72	71, 72	71, 72	71, 72
0/100/0	U	50, 51	50, 51	50, 51, 74	50, 51, 74	50, 51	50, 51
2000	L	73, 74	73, 74	73	73	74	74
2/20/78	U	57, 58	57, 58	57	57	57	57
1000	L	79, 80	79, 80	79, 80	79, 80	79, 80	79, 80
2/20/78	U	60	60	59, 60	59, 60	59, 60	59, 60
2000	L	81	81, 82	81, 82	81	81	81
15/52/33	U	61, 62	61, 62	61, 62	61, 62	61, 62	61, 62
1000	L	83, 84	83, 84	83, 84	83, 84	83, 84	83, 84
15/52/33	U	63, 64	63, 64	63, 64	63, 64	63, 64	63, 64
2000	L	85, 86	85, 86	85, 86	85, 86	85, 86	85, 86
15/52/33	U	65, 66	65, 66	65, 66	65, 66	65, 66	65, 66
3000	L	87, 88	87, 88	--	--	--	--
30/0/70	U	53	53	53	53	53	53
1000	L	75, 76	75, 76	75, 76	75, 76	75, 76	75, 76
30/0/70	U	55, 56	55, 56	55, 56	55, 56	55, 56	55, 56
2000	L	77, 78	77, 78	78	78	78	78

TABLE AI.26

SUBJECTS IN THREE-HOUR TESTS BY PERIODS AND REGIMENS
(FRA's and Specials)

Period	FRA's
PRE I	90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101
PRE II	90, 91, 92, 94, 95, 96, 97, 98, 99, 100, 101
EXP I	90, 91, 92, 94, 95, 96, 97, 98, 99, 100, 101
EXP II	90, 91, 92, 94, 95, 102, 96, 97, 98, 99, 100, 101
REC I	31, 40, 90, 91, 92, 94, 95, 102, 58, 96, 97, 98, 99, 100, 101
REC II	2, 5, 31, 40, 90, 91, 92, 94, 95, 102, 58, 96, 97, 98, 99, 100, 101
PRE I	None
PRE II	80*, 82*
EXP I	2*, 41, 70*, 74, 76, 77, 85*, 87
EXP II	3, 4, 31, 39, 40, 58, 68, 70
REC I	None
REC II	4, 82, 87

*Only part of three-hour test conducted.

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APPENDIX II

ORIGINAL BIOCHEMICAL AND PHYSIOLOGICAL DATA

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A. COMMENTS ON ORIGINAL DATA

Nutrient Regimens.

1. All subjects, except FRA controls, subsisted on 5-in-1 Ration in P I, P II, REC I, and REC II.

2. FRA controls (Nos. 90-102, incl.) subsisted on Field Ration A in all periods and subjects in REC III.

3. The FRA controls were never on restricted water.

4. "Rehab" regimen in EXP I and II refers to diets fed subjects coming off experimental regimens before end of 14-day period. The "Rehab" regimen was one of the "D" regimens.

5. Several subjects were removed from experimental diets due to respiratory disease. They were placed in Field Ration A when feasible. (See Tables AII. 1 to AII. 4.)

6. "AE" refers to air-evacuation of an ill subject.

Biochemical and Physiological Data.

1. Dashes (-) refer to data omitted because (1) subject was not tested, (2) subject was not in comparable condition to other subjects, or (3) specimens were lost or broken in storage.

2. Where data were missing in P I or P II, subject's other pre-period value or mean value for flight were substituted for calculating individual subject's pre-period mean. Such substituted values have been placed within parentheses.

3. In Tables AII. 164-167 daily biochemical data are presented. In the tables "x" stands for July; e.g., "x4" refers to specimens collected on July 4.

4. When WADC TR 53-484, Part 3, was prepared, data for fecal calcium and phosphorus were not available. These analyses together with the data on calcium and phosphorus balances are given in Tables AII. 512-527.

5. Data on sweat chemistry, both qualitative and quantitative has been incorporated in Appendix VIII.

6. Quantitative data on ketone bodies in serum, urine, and sweat for the winter study of 1954 and the summer study of 1955 are in Appendix IX.

B. TABLES OF ORIGINAL DATA

TABLE AII.1

NUTRIENT REGIMENS: FLIGHT 1
(Hard Work, Unlimited Water in EXP I and II)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	5-in-1	5-in-1	STO	STO	5-in-1	5-in-1
2	"	"	STO/Rehab	Rehab/AE	AE/FRA	FRA
3	"	"	STO	Rehab	5-in-1	5-in-1
4	"	"	STO	Rehab	"	"
5	"	"	0/100/0 1000	AE	AE/FRA	FRA
6	"	"	0/100/0 1000	0/100/0 1000	5-in-1	5-in-1
7	"	"	0/100/0 2000	0/100/0 2000	"	"
8	"	"	0/100/0 2000	0/100/0 2000	"	"
9	"	"	30/0/70 1000	30/0/70 1000	"	"
10	"	"	30/0/70 1000	30/0/70 1000	"	"
11	"	"	30/0/70 2000	30/0/70 2000	"	"
12	"	"	30/0/70 2000	30/0/70 2000	"	"
13	"	"	2/20/78 1000	AE	AE	AE
14	"	"	2/20/78 1000	2/20/78 1000	5-in-1	5-in-1
15	"	"	2/20/78 2000	2/20/78 2000	"	"
16	"	"	2/20/78 2000	AE	AE	AE
17	"	"	15/52/33 1000	15/52/33 1000	5-in-1	5-in-1
18	"	"	15/52/33 1000	15/52/33 1000	"	"
19	"	"	15/52/33 2000	15/52/33 2000	"	"
20	"	"	15/52/33 2000	AE	AE	AE
21	"	"	15/52/33 3000	15/52/33 3000	5-in-1	5-in-1
22	"	"	15/52/33 3000	15/52/33 3000	"	"
90	FRA	FRA	FRA	FRA	FRA	FRA
91	"	"	"	"	"	"
92	"	"	"	"	"	"

TABLE AII.2

NUTRIENT REGIMENS: FLIGHT 2
(Hard Work, Limited Water in EXP I and II)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	5-in-1	5-in-1	STO	STO	5-in-1	5-in-1
24	"	"	"	"	EL	EL
25	"	"	"	"	5-in-1	5-in-1
26	"	"	"	"	"	"
27	"	"	0/100/0 1000	0/100/0 1000	"	"
28	"	"	0/100/0 1000	0/100/0 1000	"	"
29	"	"	0/100/0 2000	0/100/0 2000	"	"
30	--	"	0/100/0 2000	0/100/0 2000	"	"
31	5-in-1	"	20/0/70 1000	FRA	FRA	FRA
32	"	"	20/0/70 1000	30/0/70 1000	5-in-1	5-in-1
33	"	"	30/0/70 2000	30/0/70 2000	"	"
34	"	"	30/0/70 2000	30/0/70 2000	"	"
35	"	"	2/20/78 1000	2/20/78 1000	"	"
36	"	"	2/20/78 1000	2/20/78 1000	"	"
37	"	"	2/20/78 2000	2/20/78 2000	"	"
38	"	"	2/20/78 2000	2/20/78 2000	"	"
39	"	"	15/52/33 1000	15/52/33 1000	AE	AE
40	"	"	FRA	FRA	FRA	FRA
41	"	"	15/52/33 2000	AE	AE	AE
42	"	"	15/52/33 2000	15/52/33 2000	5-in-1	5-in-1
43	"	"	15/52/33 3000	15/52/33 3000	"	"
44	"	"	15/52/33	15/52/33	"	"
93	FRA	--	- -	- -	- -	- -
94	"	FRA	FRA	FRA	FRA	FRA
95	"	"	"	"	"	"
102	- -	- -	"	"	"	"

TABLE AII.3

NUTRIENT REGIMENS: FLIGHT 3
(Light Work, Unlimited Water in EXP I and II)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	5-in-1	5-in-1	STO	STO	5-in-1	5-in-1
46	"	"	"	"	"	"
47	"	"	"	"	"	"
48	"	"	"	"	"	"
49	"	"	0/100/0 1000	0/100/0 1000	"	"
50	"	"	0/100/0 1000	0/100/0 1000	"	"
51	"	"	0/100/0 2000	0/100/0 2000	"	"
52	"	"	0/100/0 2000	0/100/0 2000	"	"
53	"	"	30/0/70 1000	30/0/70 1000	"	"
54	"	"	STO	STO	"	"
55	"	"	30/0/70 2000	30/0/70 2000	"	"
56	"	"	30/0/70 2000	30/0/70 2000	"	"
57	"	"	2/20/78 1000	2/20/78 1000	"	"
58	"	"	FRA	FRA	FRA	FRA
59	(Sick)	(Sick)	2/20/78 2000	2/20/78 2000	5-in-1	5-in-1
60	5-in-1	5-in-1	2/20/78 2000	2/20/78 2000	"	"
61	"	"	15/52/33 1000	15/52/33 1000	"	"
62	"	"	15/52/33 1000	15/52/33 1000	"	"
63	"	"	15/52/33 2000	15/52/33 2000	"	"
64	"	"	15/52/33 2000	15/52/33 2000	"	"
65	"	"	15/52/33 3000	15/52/33 3000	"	"
66	"	"	15/52/33 3000	15/52/33 3000	"	"
96	FRA	FRA	FRA	FRA	FRA	FRA
97	"	"	"	"	"	"
98	"	"	"	"	"	"

TABLE AII.4

NUTRIENT REGIMENS: FLIGHT 4
(Light Work, Limited Water in EXP I and EXP II)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	5-in-1	5-in-1	STO	STO	5-in-1	5-in-1
68	"	"	"	Rehab	"	"
69	"	"	"	STO	"	"
70	"	"	"	STO/Rehab	"	"
71	"	"	0/100/0 1000	0/100/0 1000	"	"
72	"	"	"	"	"	"
73	"	"	0/100/0 2000	0/100/0 2000	"	"
74	"	"	"	"	"	"
75	"	"	30/0/70 1000	30/0/70 1000	"	"
76	"	"	"	"	"	"
77	"	"	--	--	--	--
78	"	"	30/0/70 2000	30/0/70 2000	5-in-1	5-in-1
79	"	"	2/20/78 1000	2/20/78 1000	"	"
80	"	"	"	"	"	"
81	"	"	2/20/78 2000	2/20/78 2000	"	"
82	"	"	"	"	AE	AE
83	"	"	15/52/33 1000	15/52/33 1000	5-in-1	5-in-1
84	"	"	"	"	"	"
85	"	"	15/52/33 2000	15/52/33 2000	"	"
86	"	"	"	"	"	"
87	"	"	AE	AE	AE	FRA
88	"	"	"	"	"	AE
99	FRA	FRA	FRA	FRA	FRA	FRA
100	"	"	"	"	"	"
101	"	"	"	"	"	"

TABLE AII.5

SERUM OSMOLARITY: FLIGHT 1
(mOsm/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	269	281	286	280	284	275
2	280	278	276	---	---	279
3	288	278	281	274	278	252
4	282	280	284	278	283	267
5	288	290	278	---	---	282
6	290	288	260	274	286	280
7	288	276	284	274	282	266
8	286	278	276	276	284	277
9	284	278	285	278	282	280
10	283	283	282	280	283	280
11	293	278	282	286	288	286
12	286	272	284	280	282	281
13	287	268	286	---	---	---
14	289	280	288	276	284	284
15	289	280	288	290	282	---
16	286	267	283	---	---	---
17	284	---	292	271	282	286
18	288	286	284	280	288	284
19	289	268	286	275	276	276
20	283	273	279	---	---	---
21	286	283	283	282	283	282
22	290	268	280	281	283	280
90	286	280	284	284	270	284
91	287	269	284	284	280	272
92	292	276	282	284	277	282

TABLE AII.6

SERUM OSMOLARITY: FLIGHT 2
(mOsm/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	286	284	288	284	284	286
24	283	276	275	270	278	---
25	288	289	284	272	294	286
26	285	286	282	277	286	278
27	280	282	273	276	286	282
28	286	284	286	274	285	285
29	291	271	286	278	281	282

TABLE AII.6 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
30	---	278	288	274	278	276
31	288	274	298	284	290	290
32	286	270	288	277	284	288
33	288	283	300	286	288	289
34	286	284	294	284	281	278
35	290	281	288	281	287	279
36	284	284	278	264	282	290
37	286	278	284	288	286	282
38	284	278	292	283	286	280
39	288	281	282	274	---	---
40	282	---	---	288	292	292
41	287	288	---	---	---	284
42	290	276	300	288	290	298
43	285	279	290	280	286	286
44	286	286	272	286	289	288
93	281	---	---	---	---	---
94	286	281	282	290	282	283
95	286	263	280	286	280	284
102	---	---	---	281	291	280

TABLE AII.7

SERUM OSMOLARITY: FLIGHT 3
(mOsm/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	289	286	280	284	282	260
46	280	288	288	280	287	272
47	287	286	270	292	283	284
48	292	286	282	284	282	292
49	281	288	281	282	284	285
50	286	288	280	266	280	280
51	287	285	282	278	281	283
52	298	287	280	276	279	280
53	288	287	290	284	286	286
54	284	282	282	274	277	280
55	288	286	290	284	284	283
56	285	284	289	288	276	262
57	286	288	282	280	284	284
58	288	284	---	285	292	282
59	---	---	283	280	282	280
60	288	283	282	279	282	282
61	287	286	284	282	286	282

TABLE AII.7 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
62	284	288	282	282	279	282
63	284	286	282	286	286	282
64	284	284	281	282	281	284
65	288	286	282	280	280	282
66	290	290	285	284	282	286
96	286	291	286	283	281	284
97	288	289	288	284	286	284

TABLE AII.8

SERUM OSMOLARITY: FLIGHT 4
(mOsm/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	286	285	284	285	280	283
68	284	284	272	276	282	---
69	278	282	280	280	281	284
70	284	283	281	278	288	280
71	286	284	280	277	280	282
72	285	286	281	276	282	280
73	284	286	274	272	---	---
74	291	287	283	276	282	280
75	284	282	282	281	280	286
76	286	292	284	282	274	278
77	280	286	---	---	---	---
78	282	290	286	281	280	279
79	285	284	278	275	284	282
80	280	284	274	278	280	265
81	288	290	286	281	294	282
82	---	284	282	---	---	---
83	284	284	274	278	281	280
84	287	284	276	278	280	280
85	282	291	301	277	277	280
86	286	282	282	281	286	286
87	285	285	---	---	---	---
88	284	280	---	---	---	---
99	282	280	279	276	278	274
100	288	284	284	283	280	281
101	283	283	286	282	282	281

TABLE AII.9

SERUM SODIUM: FLIGHT 1
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	134	133	140	133	135	133
2	133	140	133	---	---	140
3	135	131	137	130	133	137
4	135	133	133	133	133	137
5	135	137	134	---	---	133
6	135	131	135	130	132	140
7	135	133	135	133	132	137
8	135	131	137	130	139	137
9	135	131	132	130	132	133
10	135	133	133	130	132	139
11	135	143	131	132	135	137
12	135	131	132	132	133	133
13	135	137	135	---	---	---
14	135	143	140	132	133	143
15	135	133	133	135	137	---
16	150	143	136	---	---	---
17	133	136	138	133	130	133
18	135	143	136	133	135	139
19	135	145	133	133	130	130
20	135	131	133	---	---	---
21	135	133	135	135	132	137
22	145	133	133	137	130	137
90	135	131	144	135	138	145
91	135	131	131	137	143	135
92	135	131	139	139	139	137

TABLE AII.10

SERUM SODIUM: FLIGHT 2
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	135	140	135	135	135	133
24	135	140	132	130	130	---
25	133	133	131	133	137	137
26	133	133	131	133	132	132
27	133	133	140	133	132	130
28	143	135	140	134	130	140
29	131	133	137	137	132	133
30	(134)	133	137	135	130	137
31	133	133	138	135	140	137
32	133	140	133	133	132	140
33	133	135	144	140	130	143
34	133	135	140	132	132	133
35	133	133	132	133	132	137

TABLE AII.10 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
36	133	135	133	133	135	137
37	131	135	135	135	130	130
38	133	133	145	135	132	130
39	133	133	135	132	---	---
40	133	(134)	---	132	133	137
41	133	133	144	---	---	137
42	143	133	135	132	132	140
43	143	133	135	133	132	137
44	131	133	133	130	133	137
93	131	---	---	---	---	---
94	131	133	137	140	141	140
95	135	133	133	139	139	135
102	---	---	---	133	146	132

TABLE AII.11

SERUM SODIUM: FLIGHT 3
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	131	137	131	132	143	130
46	131	133	131	131	144	133
47	133	133	133	133	143	135
48	133	137	131	130	138	137
49	133	137	135	130	144	140
50	133	137	135	133	137	135
51	133	131	135	132	138	130
52	137	135	137	130	133	130
53	143	135	133	130	138	133
54	131	133	130	134	132	131
55	133	135	131	133	140	133
56	133	135	131	130	136	145
57	140	135	131	143	134	133
58	135	135	---	133	134	130
59	(135)	(135)	133	133	136	133
60	135	135	131	132	136	133
61	135	135	137	132	135	131
62	135	135	131	132	136	137
63	135	137	131	132	141	130
64	143	135	131	130	138	130
65	135	135	133	130	136	133
66	135	135	133	132	140	130
96	131	133	133	135	141	132
97	137	133	135	135	134	140
98	137	131	113	135	139	140

TABLE AII.12

SERUM SODIUM: FLIGHT 4
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	137	131	133	135	136	137
68	137	131	130	135	138	---
69	135	131	131	132	140	139
70	135	135	130	130	140	133
71	135	135	130	135	138	137
72	135	131	130	132	141	137
73	135	135	131	132	---	---
74	135	135	137	137	140	137
75	131	135	131	137	139	135
76	135	131	135	133	138	139
77	135	135	137	---	---	---
78	135	135	131	135	139	133
79	137	133	131	133	132	130
80	133	133	133	135	136	140
81	131	133	131	135	140	137
82	(136)	135	135	---	---	---
83	131	133	131	137	139	133
84	140	135	135	133	140	130
85	135	135	143	137	138	130
86	145	137	130	133	141	137
87	143	133	140	---	---	140
88	135	133	----	---	---	---
99	131	135	133	132	140	133
100	131	133	131	132	140	133
101	135	133	137	135	139	132

TABLE AII.13

SERUM POTASSIUM: FLIGHT 1
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	5.0	4.2	4.2	4.5	4.7	4.4
2	5.0	4.3	4.0	---	---	4.7
3	4.2	4.3	4.4	4.2	4.4	4.7
4	4.3	4.8	4.0	4.0	4.4	5.0
5	4.3	4.0	3.8	---	---	4.4
6	4.4	4.0	3.8	3.2	4.2	4.2
7	4.2	4.0	4.2	3.8	4.7	4.7
8	4.4	4.7	3.8	3.8	4.2	4.7

TABLE AII.13 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
9	4.3	4.2	4.0	4.0	4.7	4.4
10	3.9	3.8	4.4	4.2	4.2	4.9
11	4.2	4.6	4.2	4.0	4.7	4.9
12	5.2	3.8	4.2	3.8	5.0	4.7
13	4.2	4.2	4.4	---	---	---
14	4.3	4.0	3.8	4.2	5.5	4.4
15	4.4	4.0	4.2	3.8	4.7	---
16	4.3	4.2	3.8	---	---	---
17	3.7	(4.2)	4.2	4.2	4.2	4.7
18	5.2	5.1	4.2	4.8	5.0	4.4
19	4.2	3.8	3.8	4.0	4.4	4.9
20	4.4	4.2	4.4	---	---	---
21	5.0	3.8	4.4	4.8	5.0	5.0
22	5.4	4.0	3.8	4.2	4.7	4.9
90	5.2	3.8	5.4	3.7	5.0	5.0
91	5.2	4.0	4.7	3.7	4.2	4.4
92	5.0	4.0	5.0	4.2	4.7	4.2

TABLE AII.14

SERUM POTASSIUM: FLIGHT 2
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	5.0	4.7	4.2	4.8	4.4	4.0
24	5.2	5.2	4.2	5.0	5.0	---
25	4.8	4.2	4.0	5.0	5.0	4.9
26	4.8	4.2	3.8	5.0	4.4	4.4
27	4.8	5.0	4.0	4.0	4.7	4.0
28	4.5	4.2	4.0	3.4	4.4	4.0
29	4.5	4.2	3.2	3.8	4.2	3.8
30	(4.8)	5.0	3.4	3.8	4.7	4.0
31	4.5	4.2	4.0	4.8	4.7	4.2
32	5.0	4.2	3.8	4.0	4.9	3.8
33	4.5	4.2	3.8	4.5	4.4	4.4
34	5.0	4.2	3.8	4.0	4.2	4.0
35	5.2	4.4	4.0	4.8	5.0	4.2
36	4.5	4.7	3.8	4.0	5.0	4.0
37	4.5	4.4	3.8	4.2	4.4	3.8
38	4.5	4.2	4.0	4.0	5.0	4.2
39	4.5	4.2	4.0	4.5	---	---
40	6.2	(4.4)	---	5.0	5.0	5.0
41	4.8	4.2	3.8	---	---	4.0

TABLE AII.14 (contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
42	4.8	4.2	3.8	4.8	4.7	4.7
43	4.8	4.7	4.0	4.2	4.2	3.8
44	5.0	4.0	3.8	4.8	5.0	4.7
93	4.8	---	---	---	---	---
94	5.0	3.0	4.2	4.4	4.0	4.6
95	5.0	3.8	4.7	4.4	4.7	4.4
102	---	---	---	3.7	4.7	4.0

TABLE AII.15

SERUM POTASSIUM: FLIGHT 3
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	4.5	4.5	4.8	4.2	4.4	5.0
46	4.5	4.7	5.0	4.6	5.0	4.4
47	4.2	3.8	4.2	4.0	4.2	4.2
48	4.2	4.5	4.8	4.4	4.7	4.6
49	4.5	4.5	4.0	3.8	4.2	4.4
50	4.5	4.5	4.2	4.0	4.6	4.0
51	5.0	4.0	4.0	3.8	4.2	5.0
52	5.6	4.7	4.2	4.2	5.0	4.7
53	5.0	4.5	5.0	5.0	5.0	4.2
54	5.0	5.0	4.8	4.6	4.4	4.7
55	5.5	4.2	5.0	4.6	4.7	4.7
56	4.8	4.5	5.2	4.4	4.7	5.0
57	5.5	5.0	4.8	5.0	5.3	5.0
58	4.2	4.0	---	4.2	4.4	4.0
59	(4.8)	(4.4)	5.0	4.0	4.4	4.4
60	4.5	4.0	4.2	4.2	4.2	4.2
61	5.2	4.5	5.0	4.6	4.4	5.0
62	4.8	4.0	4.5	4.2	4.7	4.6
63	4.5	4.0	4.5	3.8	4.2	4.4
64	5.2	4.7	5.0	4.6	5.2	5.0
65	4.2	4.5	5.2	4.2	4.7	4.4
66	5.2	4.2	5.2	4.4	4.7	4.6
96	5.0	4.2	5.2	4.2	4.2	5.0
97	5.0	3.8	5.4	3.9	4.4	4.4
98	5.0	4.4	3.7	3.9	4.4	4.7

TABLE AII.16

SERUM POTASSIUM: FLIGHT 4
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	4.8	4.0	4.8	4.2	4.2	4.4
68	4.5	3.8	4.8	5.5	5.0	---
69	4.5	4.2	4.0	5.0	4.4	4.6
70	4.5	4.0	4.8	4.4	4.4	4.4
71	4.5	4.2	4.0	4.7	4.7	5.0
72	5.0	4.0	4.2	4.7	5.0	4.6
73	4.5	4.0	3.8	4.4	---	---
74	4.8	3.8	5.0	3.7	4.7	4.2
75	4.8	3.8	3.8	4.2	4.4	4.2
76	4.5	3.8	4.7	5.0	4.7	4.2
77	5.2	4.2	4.0	---	---	---
78	4.5	3.8	3.8	4.2	4.2	4.0
79	5.2	4.0	4.4	4.9	5.0	4.2
80	5.2	4.0	4.8	4.7	4.4	3.8
81	5.2	4.5	4.4	4.0	5.0	4.4
82	(4.8)	4.2	3.8	---	---	---
83	5.0	4.0	3.8	4.2	4.4	4.2
84	5.2	3.8	4.4	4.0	4.4	4.2
85	4.8	3.8	3.8	4.2	4.2	3.8
86	5.0	4.0	4.8	4.4	5.0	3.8
87	4.5	3.8	4.0	---	---	4.4
88	4.8	3.8	---	---	---	---
99	4.8	3.8	5.4	3.7	4.4	4.4
100	4.5	4.2	5.0	3.7	4.2	4.4
101	4.8	3.8	5.4	3.9	5.0	3.8

TABLE AII.17

SERUM CALCIUM: FLIGHT 1
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	10.3	9.9	11.5	11.3	9.7	9.9
2	10.5	10.4	10.4	----	----	9.7
3	10.2	9.9	10.6	10.8	10.0	10.8
4	10.0	10.7	10.4	10.6	9.7	9.7
5	10.2	10.8	11.1	----	----	11.0
6	10.5	10.6	10.1	10.7	10.7	10.5
7	11.4	10.2	11.3	10.1	10.8	11.5

TABLE AII.17 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
8	10.4	10.6	10.8	9.7	10.3	10.3
9	11.2	10.4	10.0	10.1	9.7	10.0
10	9.8	10.8	10.6	10.6	10.2	10.6
11	10.8	10.4	10.7	10.4	10.7	10.5
12	10.7	9.9	9.8	10.5	10.1	10.1
13	10.1	10.5	10.9	----	----	----
14	10.5	10.7	12.0	10.9	10.9	10.5
15	11.1	9.6	11.0	11.2	10.5	----
16	9.8	9.8	11.2	----	----	----
17	10.9	(10.4)	12.0	10.8	10.0	11.0
18	11.1	10.7	10.6	11.5	10.5	10.7
19	11.0	11.2	11.9	11.2	9.9	11.1
20	10.6	10.6	11.6	----	----	----
21	10.8	11.5	11.6	11.4	11.6	11.3
22	10.3	9.6	10.5	11.1	10.9	10.1
90	10.7	11.3	11.3	9.6	10.9	10.7
91	9.5	9.7	11.0	10.1	10.0	9.7
92	10.1	10.7	11.5	10.7	10.0	10.3

TABLE AII.18

SERUM CALCIUM: FLIGHT 2
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	10.5	10.5	10.3	11.1	10.2	10.4
24	10.7	10.2	10.4	10.5	9.8	----
25	9.5	10.1	11.7	11.2	9.6	10.6
26	10.4	9.6	10.3	11.7	10.1	10.5
27	10.6	10.7	10.5	11.2	10.3	9.5
28	10.6	10.4	11.5	11.3	10.4	11.2
29	9.9	10.8	10.4	10.9	10.3	10.3
30	(10.2)	10.8	10.7	11.1	9.9	9.9
31	10.0	9.9	11.1	10.9	9.8	10.4
32	10.1	10.2	11.3	11.3	10.1	11.2
33	10.2	10.5	11.9	10.6	10.4	11.0
34	10.8	10.4	10.6	11.3	9.9	11.0
35	10.2	11.0	12.1	10.9	9.9	10.7
36	9.8	10.4	10.1	11.3	9.7	10.5
37	10.5	10.9	10.8	9.4	9.9	10.8
38	10.2	10.3	10.6	10.8	10.6	10.8
39	9.8	10.0	11.0	10.4	----	----

TABLE AII.18 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
40	9.8	(10.4)	----	10.4	10.2	9.8
41	10.3	10.1	10.4	----	----	10.4
42	10.6	11.1	10.9	11.4	10.1	11.4
43	9.9	11.1	10.7	10.5	10.1	10.9
44	10.3	10.4	11.0	11.8	10.4	10.8
93	10.6	----	----	----	----	----
94	10.4	10.2	10.4	10.5	10.6	10.8
95	10.2	11.3	10.4	10.7	11.0	10.6
102	----	----	----	10.7	10.6	10.6

TABLE AII.19

SERUM CALCIUM: FLIGHT 3
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	10.7	10.9	10.5	10.9	9.5	10.0
46	10.0	10.8	10.9	10.4	9.6	10.1
47	9.7	10.1	11.1	10.8	10.2	10.2
48	10.2	10.1	10.8	11.2	10.1	10.4
49	10.1	10.8	11.0	10.7	10.3	10.8
50	9.8	10.9	12.0	10.9	10.3	10.7
51	10.3	10.8	11.6	11.2	9.8	10.6
52	10.5	10.4	11.0	10.6	9.6	10.8
53	10.1	10.3	10.9	10.8	10.6	10.3
54	10.7	10.5	11.6	11.7	10.2	9.5
55	10.3	10.4	11.4	11.8	10.1	10.1
56	10.6	10.9	10.7	10.9	10.7	9.8
57	10.2	10.8	10.3	10.2	10.6	10.1
58	9.8	10.2	----	10.7	10.4	10.3
59	(10.2)	(10.5)	11.4	11.1	10.3	10.1
60	11.5	10.0	10.9	10.7	9.8	9.9
61	10.1	10.3	10.5	10.2	10.9	10.4
62	9.9	10.1	9.8	11.8	10.6	9.8
63	10.4	9.9	11.9	10.5	10.8	10.6
64	9.2	10.6	10.6	11.0	10.4	10.6
65	9.7	10.2	9.8	10.2	9.9	10.1
66	10.8	10.7	10.3	11.0	10.2	10.3
96	9.8	10.7	10.8	10.0	10.5	10.2
97	10.8	10.4	11.3	10.5	10.6	10.2
98	10.1	9.8	10.2	10.5	10.1	9.8

TABLE AII.20

SERUM CALCIUM: FLIGHT 4
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	9.8	9.9	10.9	10.6	10.5	9.7
68	10.4	10.8	11.0	10.6	10.3	----
69	10.0	10.2	10.8	10.0	10.8	10.4
70	10.4	10.8	10.5	10.0	9.9	11.3
71	10.7	10.5	11.2	11.0	10.4	10.5
72	9.9	9.8	10.6	10.6	10.6	10.6
73	9.5	9.6	11.1	10.5	----	----
74	12.1	10.7	12.0	11.0	11.0	10.6
75	10.0	9.9	10.1	10.7	10.2	10.0
76	11.9	11.0	11.5	10.8	10.5	10.3
77	10.2	10.8	10.9	----	----	----
78	9.9	10.5	10.9	9.9	10.5	10.1
79	9.8	10.7	11.0	11.8	10.4	11.1
80	9.9	10.1	11.3	10.5	10.9	9.6
81	9.6	11.0	10.6	11.2	10.4	10.4
82	(10.2)	9.8	10.6	----	----	9.9
83	10.1	10.7	9.6	10.8	9.8	10.4
84	9.8	10.7	10.9	10.3	10.4	10.1
85	10.4	11.5	11.6	11.0	10.2	10.0
86	10.2	11.5	10.7	10.1	10.3	10.1
87	9.7	10.5	10.6	----	----	10.6
88	9.5	10.7	----	----	----	----
99	9.5	10.7	11.7	10.4	9.5	10.2
100	9.8	10.2	10.5	10.3	10.3	10.9
101	10.3	10.6	11.3	10.9	10.8	10.6

TABLE AII.21

SERUM INORGANIC PHOSPHATE: FLIGHT 1
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	4.1	4.2	4.1	3.9	4.5	3.9
2	3.7	3.8	3.8	---	---	4.3
3	4.3	3.7	3.8	3.7	4.2	3.7
4	3.9	3.5	5.2	4.2	4.1	4.3
5	4.1	3.7	4.0	---	---	4.3
6	4.1	3.9	4.1	4.6	3.5	3.7
7	3.9	3.8	4.4	4.5	4.7	3.8
8	4.1	4.2	4.6	4.4	4.3	4.2

TABLE AII.21 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
9	3.5	3.5	3.0	3.7	3.5	3.7
10	3.5	3.7	4.0	3.7	4.0	4.1
11	4.6	4.7	3.8	4.2	3.9	3.7
12	3.7	3.7	4.0	3.8	4.3	3.8
13	4.3	3.7	4.0	---	---	---
14	4.4	4.5	4.6	4.6	4.4	4.5
15	4.1	3.8	3.8	4.1	3.7	---
16	5.1	5.6	5.0	---	---	---
17	3.6	(4.1)	4.8	4.5	3.9	3.8
18	4.9	4.6	4.8	4.6	4.3	4.6
19	4.4	4.9	3.8	4.7	4.3	4.5
20	4.4	3.7	3.8	---	---	---
21	5.0	4.6	4.8	5.1	4.9	4.7
22	4.3	3.7	4.4	4.2	4.2	4.5
90	5.3	3.9	4.0	3.7	4.2	4.2
91	4.5	3.9	3.8	4.8	3.9	4.2
92	4.5	4.5	4.4	4.9	4.5	4.6

TABLE AII.22

SERUM INORGANIC PHOSPHATE: FLIGHT 2
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	3.5	3.5	4.0	3.5	4.1	3.9
24	4.4	4.6	4.8	4.3	4.3	---
25	4.3	3.5	3.8	3.9	4.5	4.7
26	4.4	3.9	4.2	3.9	3.8	3.9
27	4.6	4.6	4.9	4.9	5.2	5.0
28	3.5	3.7	3.8	3.5	3.5	5.0
29	4.1	5.3	4.9	3.7	3.8	4.5
30	(4.2)	3.9	4.2	3.9	3.9	4.1
31	3.7	3.7	4.4	4.6	4.7	4.9
32	4.1	3.8	4.2	3.5	3.8	5.5
33	4.1	3.9	4.2	3.8	4.1	4.3
34	4.3	4.5	4.4	4.5	4.1	4.9
35	4.5	5.2	4.4	3.9	4.3	4.9
36	3.9	4.5	4.5	3.5	4.3	5.0
37	5.3	4.3	4.4	4.5	4.7	4.7
38	4.1	3.8	4.8	3.9	4.3	4.5
39	4.3	3.9	5.0	3.7	---	---
40	4.6	(4.2)	---	5.8	5.5	4.9
41	4.1	3.9	4.6	---	---	4.5
42	3.9	4.2	4.8	4.5	4.3	4.3
43	3.7	4.2	4.0	3.9	4.6	4.3

TABLE AII.22 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
44	4.6	4.3	4.2	4.1	4.6	4.6
93	4.1	---	---	---	---	---
94	4.5	3.5	4.4	4.8	4.6	4.9
95	4.5	4.0	4.6	5.1	4.3	5.0
102	---	---	---	4.3	4.4	4.2

TABLE AII.23

SERUM INORGANIC PHOSPHATE: FLIGHT 3
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	4.4	4.4	4.1	4.1	4.3	4.9
46	4.6	4.1	4.6	4.5	4.7	4.9
47	4.0	3.7	4.6	3.8	4.3	4.4
48	3.6	3.7	4.0	3.7	4.5	4.4
49	4.2	4.2	4.1	4.1	4.5	4.5
50	3.9	3.9	4.8	3.9	4.3	4.6
51	4.0	3.7	3.6	3.6	3.8	4.5
52	4.4	3.5	4.4	4.2	4.9	4.5
53	3.9	3.8	3.8	3.6	4.7	4.5
54	4.5	4.4	4.0	3.7	4.5	4.3
55	3.7	3.9	4.0	4.1	4.1	4.2
56	3.7	3.8	4.0	3.8	4.1	4.1
57	3.8	3.9	3.7	3.6	4.5	4.4
58	3.7	4.1	---	4.4	4.5	3.8
59	(4.0)	(4.0)	3.8	4.0	4.5	4.6
60	4.4	4.3	4.6	4.3	4.9	4.7
61	4.0	4.5	4.6	4.4	4.6	4.6
62	3.8	4.1	3.5	3.9	4.6	4.6
63	4.0	4.5	4.8	4.1	4.5	4.9
64	4.5	4.1	4.8	4.7	4.6	5.3
65	3.8	3.9	4.3	3.8	3.7	4.6
66	3.7	3.9	4.2	4.3	4.2	4.5
96	4.8	4.7	4.3	5.1	4.4	5.0
97	4.6	4.6	4.4	4.6	4.7	4.6
98	4.2	4.0	3.8	4.1	4.2	4.2

TABLE AII.24

SERUM INORGANIC PHOSPHATE: FLIGHT 4
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	4.1	3.5	3.8	3.7	3.9	4.4
68	3.9	3.5	3.5	3.5	3.7	---

TABLE AII.24 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
69	4.0	3.7	3.8	3.6	4.2	4.3
70	4.5	4.4	3.5	3.7	4.4	4.8
71	4.2	4.5	4.2	3.7	3.8	4.6
72	4.4	3.9	5.2	4.2	3.8	4.4
73	4.6	3.9	3.2	3.7	---	---
74	3.6	3.7	3.7	3.5	3.8	3.2
75	3.9	3.8	3.5	3.7	4.3	4.4
76	3.8	3.9	3.7	3.3	3.8	4.3
77	4.5	4.5	3.7	---	---	---
78	3.7	3.9	3.9	3.5	3.7	3.8
79	4.8	4.1	3.5	3.5	4.5	4.6
80	4.4	3.5	4.2	3.6	3.8	4.3
81	4.5	4.5	4.4	3.3	4.5	4.8
82	(4.2)	4.5	4.2	---	---	4.9
83	4.5	4.1	4.0	4.1	4.1	4.2
84	4.5	3.9	4.0	4.2	4.6	4.4
85	4.4	3.7	4.0	3.6	3.7	4.0
86	5.0	4.9	4.9	3.9	4.7	5.0
87	3.6	4.2	4.5	---	---	4.9
88	3.9	3.9	---	---	---	---
99	4.6	5.3	4.1	4.8	4.6	4.6
100	4.6	3.8	4.6	4.2	3.9	4.5
101	4.7	4.7	5.0	5.3	4.7	4.5

TABLE AII.25

SERUM CHLORIDE: FLIGHT 1
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	101	100	94	95	99	103
2	101	105	97	---	---	105
3	104	96	98	95	102	103
4	103	98	99	100	93	101
5	104	106	98	---	---	106
6	105	102	96	91	107	108
7	102	98	97	99	103	101
8	102	100	97	91	98	103
9	103	101	94	97	102	101
10	105	103	96	98	105	105
11	104	101	99	106	107	101
12	100	96	100	93	103	104
13	104	97	100	---	---	---
14	101	103	96	99	104	101
15	104	100	103	105	100	---

TABLE AII.25 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
16	101	102	103	---	---	---
17	100	(100)	99	102	102	102
18	103	99	97	104	101	104
19	98	101	103	99	102	100
20	103	100	101	---	---	---
21	100	103	98	105	102	103
22	102	97	102	101	101	104
90	102	98	106	103	102	102
91	104	96	104	107	101	101
92	104	102	101	103	100	101

TABLE AII.26

SERUM CHLORIDE: FLIGHT 2
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	100	103	102	96	102	105
24	101	104	97	89	104	---
25	103	104	97	93	107	105
26	99	97	101	94	100	100
27	99	102	100	96	104	95
28	98	102	102	98	103	98
29	105	98	103	96	101	98
30	(102)	105	103	98	103	100
31	103	101	103	101	102	102
32	103	104	102	99	101	105
33	104	103	105	104	105	105
34	102	102	104	101	101	98
35	105	102	101	98	100	102
36	101	105	98	98	102	103
37	100	102	105	104	100	102
38	102	101	104	104	101	99
39	97	101	104	96	---	---
40	99	(102)	---	99	101	104
41	105	104	106	---	---	105
42	103	101	103	97	103	102
43	100	103	106	103	101	102
44	102	102	102	101	104	105
93	98	---	---	---	---	---
94	106	102	105	106	103	101
95	102	103	99	105	100	101
102	---	---	---	103	99	101

TABLE AII.27

SERUM CHLORIDE: FLIGHT 3
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	103	106	90	88	102	102
46	99	106	101	94	106	102
47	104	103	96	91	104	103
48	101	106	98	97	104	103
49	100	105	99	91	102	104
50	106	106	100	97	105	104
51	106	107	104	98	106	104
52	108	101	100	97	101	101
53	104	104	101	97	105	103
54	100	103	95	91	104	102
55	102	100	103	103	103	100
56	103	103	102	99	106	96
57	107	106	100	100	105	102
58	101	105	---	100	104	100
59	(103)	(104)	103	101	104	102
60	106	106	105	101	100	102
61	101	104	100	98	104	98
62	106	104	91	101	105	100
63	102	104	101	101	104	100
64	101	104	104	101	106	101
65	104	104	106	100	107	102
66	106	107	100	103	107	102
96	105	106	103	105	106	102
97	105	100	102	102	103	98
98	106	95	107	106	103	105

TABLE AII.28

SERUM CHLORIDE: FLIGHT 4
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	103	98	102	97	105	104
68	103	99	100	97	105	---
69	100	100	98	94	103	101
70	101	106	100	98	103	101
71	101	104	102	94	101	101
72	104	103	97	96	101	96
73	99	104	100	96	---	---
74	103	102	99	95	104	99
75	106	104	94	100	107	103
76	103	104	96	96	103	100
77	102	104	108	---	---	---
78	101	102	102	101	104	100

TABLE AII.28 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	107	103	106	99	104	100
80	103	106	105	98	104	102
81	103	104	106	102	103	102
82	(102)	103	104	---	---	---
83	102	103	93	99	104	100
84	101	101	101	99	102	100
85	101	101	113	100	102	101
86	104	106	103	102	106	105
87	104	103	115	---	---	98
88	101	106	---	---	---	---
99	107	106	103	105	103	101
100	102	103	102	102	100	99
101	100	104	96	105	100	98

TABLE AII.29

SERUM CHOLINESTERASE: FLIGHT 1
(ΔpH/hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.91	0.70	0.86	0.83	0.64	1.02
2	0.63	0.54	0.67	----	----	0.58
3	0.54	0.47	0.55	0.43	0.36	0.42
4	0.65	0.65	0.77	0.52	0.50	0.60
5	0.91	0.84	0.84	----	----	0.77
6	0.90	0.89	0.87	0.66	0.57	0.74
7	0.60	0.50	0.65	0.53	0.51	0.58
8	0.76	0.56	0.70	0.54	0.56	0.65
9	0.53	0.37	0.54	0.40	0.41	0.42
10	0.70	0.52	0.66	0.54	0.53	0.63
11	0.78	0.75	0.78	0.68	0.64	0.70
12	0.86	0.83	0.92	0.88	0.80	0.85
13	0.78	0.75	0.80	----	----	----
14	0.68	0.64	0.76	0.66	0.56	0.60
15	0.84	0.61	0.76	0.64	0.62	----
16	0.67	0.59	0.66	----	----	----
17	0.80	(0.63)	0.98	0.82	0.81	0.88
18	0.62	0.47	0.68	0.59	0.56	0.53
19	0.60	0.44	0.54	0.46	0.43	0.50
20	0.74	0.67	0.79	----	----	----
21	0.74	0.58	0.78	0.69	0.74	0.76
22	0.80	0.71	0.76	0.69	0.80	0.81
90	0.69	0.57	0.73	0.68	0.74	0.80
91	0.55	0.44	0.56	0.49	0.57	0.55
92	0.54	0.55	0.58	0.49	0.52	0.58

TABLE AII.30

SERUM CHOLINESTERASE: FLIGHT 2
(ΔpH/hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.58	0.68	0.62	0.55	0.43	0.48
24	0.76	0.76	0.81	0.70	0.58	----
25	0.83	0.84	0.90	0.80	0.72	0.73
26	0.83	0.87	0.94	0.79	0.70	0.76
27	0.63	0.68	0.68	0.53	0.50	0.52
28	0.59	0.60	0.63	0.55	0.48	0.53
29	0.75	0.72	0.80	0.73	0.65	0.70
30	(0.71)	0.62	0.64	0.58	0.52	0.53
31	0.76	0.66	0.82	0.58	0.60	0.69
32	0.71	0.72	0.80	0.71	0.66	0.64
33	0.67	0.70	0.80	0.63	0.60	0.64
34	0.79	0.79	0.84	0.72	0.72	0.76
35	0.74	0.71	0.74	0.62	0.60	0.58
36	0.79	0.81	0.79	0.68	0.68	0.85
37	0.76	0.58	0.60	0.54	0.56	0.58
38	0.74	0.58	0.75	0.53	0.60	0.64
39	0.59	0.52	0.66	0.51	----	----
40	0.76	(0.69)	----	0.70	----	0.83
41	0.69	0.59	0.73	----	----	0.79
42	0.65	0.63	0.72	0.68	0.58	0.70
43	0.65	0.72	0.80	0.70	0.66	0.76
44	0.69	0.71	0.76	0.69	0.60	0.68
93	0.58	----	----	----	----	----
94	0.68	0.66	0.66	0.53	0.64	0.67
95	0.67	0.66	0.64	0.70	0.68	0.76
102	----	----	----	0.64	0.58	0.56

TABLE AII.31

SERUM CHOLINESTERASE: FLIGHT 3
(ΔpH/hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.62	0.71	0.77	0.70	0.50	0.69
46	0.55	0.59	0.71	0.64	0.46	0.60
47	0.54	0.60	0.66	0.62	0.44	0.56
48	0.59	0.66	0.77	0.70	0.53	0.65
49	0.64	0.65	0.68	0.62	0.51	0.60
50	0.51	0.64	0.70	0.63	0.53	0.67
51	0.72	0.77	0.82	0.72	0.73	0.81
52	0.93	0.69	0.78	0.68	0.60	0.77
53	0.60	0.57	0.61	0.53	0.52	0.58
54	0.74	0.78	0.86	0.72	0.60	0.72

TABLE AII.31 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
55	0.77	0.82	0.92	0.78	0.74	0.80
56	0.64	0.70	0.86	0.76	0.66	0.69
57	0.76	0.81	0.77	0.66	0.66	0.71
58	0.65	0.59	----	0.66	0.72	0.77
59	(0.63)	(0.70)	0.96	0.84	0.95	0.99
60	0.69	0.80	0.87	0.78	0.80	0.85
61	0.66	0.73	0.75	0.77	0.68	0.70
62	0.75	0.77	0.70	0.78	0.70	0.63
63	0.76	0.78	0.86	0.81	0.76	0.84
64	0.61	0.55	0.70	0.64	0.62	0.66
65	0.71	0.80	0.85	0.82	0.74	0.86
66	0.69	0.69	0.77	0.73	0.74	0.76
96	0.69	0.78	0.77	0.80	0.72	0.80
97	0.75	0.80	0.84	0.82	0.75	0.80
98	0.65	0.65	0.60	0.69	0.62	0.74

TABLE AII.32

SERUM CHOLINESTERASE: FLIGHT 4
(ΔpH/hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.68	0.55	0.66	0.65	0.50	0.48
68	0.99	0.89	0.97	0.82	0.76	----
69	0.78	0.50	0.66	0.55	0.48	0.48
70	0.99	0.86	0.90	0.78	0.82	0.84
71	0.77	0.73	0.86	0.82	0.76	0.70
72	0.76	0.65	0.73	0.68	0.64	0.68
73	0.61	0.50	0.62	0.46	----	----
74	1.00	0.85	0.96	0.84	0.99	0.90
75	0.68	0.59	0.76	0.69	0.60	0.60
76	1.10	0.88	1.02	0.86	0.80	0.87
77	0.67	0.58	0.70	----	----	----
78	0.82	0.68	0.93	0.81	0.78	0.80
79	0.89	0.74	0.84	0.72	0.72	0.72
80	0.68	0.72	0.71	0.68	0.62	0.60
81	0.57	0.56	0.63	0.55	0.58	0.65
82	(0.79)	0.70	0.74	----	----	0.73
83	0.69	0.70	0.64	0.61	0.58	0.70
84	0.86	0.80	0.80	0.73	0.70	0.82
85	0.62	0.68	0.60	0.59	0.63	0.70
86	0.88	0.78	0.87	0.70	0.78	0.80
87	0.78	0.66	0.78	----	----	0.80
88	0.67	0.66	----	----	----	----
99	0.67	0.66	0.55	0.67	0.69	0.76
100	0.77	0.77	0.61	0.80	0.80	0.78
101	0.56	0.55	0.48	0.63	0.58	0.60

TABLE AII.33

SERUM AMYLASE: FLIGHT 1
(Amylase Units/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	45	93	77	43	77	61
2	25	45	50	--	--	43
3	50	72	42	55	61	65
4	56	110	56	70	93	115
5	46	65	50	--	--	74
6	60	116	62	44	106	98
7	64	120	56	85	98	78
8	35	71	35	50	55	66
9	68	100	50	85	93	84
10	35	72	30	55	68	49
11	60	93	47	68	73	61
12	50	77	55	75	78	90
13	44	63	32	--	--	--
14	68	125	62	75	100	100
15	113	110	55	75	90	--
16	60	95	45	--	--	--
17	44	(86)	37	49	53	48
18	105	115	125	50	113	86
19	86	68	30	79	63	77
20	68	80	45	--	--	--
21	64	71	50	68	68	66
22	44	43	49	45	35	40
90	80	195	55	43	110	150
91	76	71	50	67	53	55
92	57	80	58	68	56	73

TABLE AII.34

SERUM AMYLASE: FLIGHT 2
(Amylase Units/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	68	100	85	60	90	112
24	70	86	125	45	100	--
25	64	86	63	75	93	115
26	75	121	93	79	76	105
27	76	145	94	63	50	100
28	75	95	225	50	94	90
29	68	87	95	90	53	51
30	(57)	120	50	55	103	103
31	43	115	123	130	117	103
32	64	95	165	85	70	65
33	50	63	77	68	75	55

TABLE AII.34 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
34	30	68	75	68	43	69
35	56	77	105	90	90	43
36	44	86	183	60	61	35
37	56	86	185	68	80	68
38	64	86	100	79	85	78
39	70	127	135	145	---	---
40	46	(90)	---	90	60	43
41	61	72	---	---	---	44
42	55	93	183	43	50	49
43	38	30	80	75	70	48
44	28	45	50	60	45	25
93	68	---	---	---	---	---
94	72	121	152	145	93	69
95	64	75	95	100	56	56
102	---	---	---	---	52	35

TABLE AII.35

SERUM AMYLASE: FLIGHT 3
(amylase units/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	55	48	65	56	75	68
46	62	55	75	75	85	61
47	48	50	62	70	60	51
48	33	50	51	67	61	43
49	25	38	44	45	40	83
50	45	44	48	55	68	48
51	70	57	70	85	98	165
52	68	40	86	85	47	85
53	46	70	64	43	70	51
54	68	78	61	80	68	78
55	44	75	75	90	61	86
56	44	72	74	70	60	89
57	35	76	76	68	78	85
58	35	57	---	75	38	55
59	(55)	(61)	62	98	79	48
60	60	91	76	80	90	100
61	56	77	74	79	68	60
62	25	54	47	45	41	48
63	43	49	44	45	40	48
64	60	73	73	70	63	85
65	155	72	75	79	68	69
66	85	48	74	63	38	51
96	123	93	49	105	55	85
97	100	65	74	70	50	60
98	83	50	102	75	42	51

TABLE AII.36

SERUM AMYLASE: FLIGHT 4
(amylase units/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	76	58	102	108	70	66
68	126	93	227	110	123	---
69	83	75	250	140	105	99
70	84	80	86	63	61	44
71	60	68	80	70	63	66
72	50	45	97	60	76	50
73	71	50	126	68	---	---
74	63	45	63	51	50	65
75	75	62	75	68	70	55
76	80	60	96	75	78	56
77	56	40	---	---	---	---
78	55	96	100	71	45	74
79	45	45	71	60	56	98
80	115	64	100	68	70	60
81	117	81	155	76	93	105
82	(85)	50	84	---	---	85
83	120	73	102	43	94	68
84	94	51	102	68	68	55
85	80	50	76	75	60	50
86	63	55	73	63	55	51
87	200	220	---	---	---	130
88	65	69	---	---	---	---
99	135	68	100	79	45	60
100	72	48	147	55	70	25
101	60	60	102	79	53	43

TABLE AII.37

SERUM UREA NITROGEN: FLIGHT 1
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	23.5	19.3	23.4	18.8	17.1	15.0
2	24.2	20.8	21.0	----	----	19.9
3	21.5	11.5	25.3	14.2	19.1	14.5
4	20.5	19.0	25.3	15.5	19.6	16.5
5	22.0	22.0	12.2	----	----	19.2
6	27.0	25.4	21.3	18.6	26.6	19.6
7	27.5	22.0	13.8	10.8	23.2	16.0
8	21.0	16.2	11.0	7.5	18.0	14.5

TABLE AII.37 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
9	21.0	19.0	20.6	20.2	17.9	15.0
10	11.5	12.0	23.8	20.9	18.6	11.5
11	20.0	18.5	25.8	25.9	27.2	24.5
12	19.9	19.0	22.6	22.5	19.4	18.0
13	18.0	17.0	17.5	----	----	----
14	23.4	19.8	15.6	11.1	18.2	17.1
15	22.5	20.2	13.6	7.0	25.2	----
16	15.5	25.5	9.7	----	----	----
17	21.5	(19.7)	18.9	16.1	20.7	17.5
18	19.0	18.8	16.8	18.3	15.0	15.7
19	19.3	25.2	24.0	19.2	20.7	16.2
20	20.5	16.8	14.4	----	----	----
21	16.1	27.0	18.4	16.7	17.5	17.0
22	17.5	17.8	16.4	18.5	24.8	17.0
90	15.6	17.0	17.5	14.7	17.8	18.9
91	15.6	20.8	19.4	20.6	22.8	23.6
92	17.8	25.5	15.2	17.3	25.5	16.1

TABLE AII.38

SERUM UREA NITROGEN: FLIGHT 2
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	16.7	19.8	27.0	22.5	17.1	15.5
24	14.0	20.2	25.8	20.2	22.0	----
25	17.4	20.4	26.7	23.8	19.1	13.4
26	17.2	19.0	27.2	21.0	24.8	16.0
27	18.2	17.5	17.1	12.0	22.9	17.5
28	19.5	22.2	24.7	17.0	18.7	17.0
29	18.2	20.9	19.6	13.8	22.0	13.0
30	(19.0)	21.3	15.4	13.2	14.5	18.4
31	19.5	20.9	27.4	27.9	18.0	14.1
32	18.2	17.3	29.2	26.0	20.6	12.0
33	15.1	17.8	35.4	35.0	14.5	12.7
34	16.5	17.8	29.0	33.5	13.6	10.0
35	18.4	23.8	23.9	18.2	17.0	17.4
36	21.0	17.5	21.6	11.8	15.6	29.3
37	23.5	20.0	20.7	12.7	18.7	25.2
38	18.2	19.0	24.3	13.3	18.7	15.8
39	18.4	20.7	21.6	14.7	----	----
40	22.5	(19.6)	----	12.9	11.0	13.2
41	26.1	20.3	38.2	----	----	22.0
42	19.1	17.0	31.1	20.0	16.4	17.0
43	20.0	16.9	23.2	24.4	15.0	13.2
44	21.5	20.7	29.6	23.4	15.5	14.5
93	19.1	----	----	----	----	----
94	19.8	17.3	14.0	15.5	17.9	15.6
95	18.6	24.9	15.0	17.0	15.8	17.2
102	----	----	----	14.0	19.0	23.9

TABLE AII.39

SERUM UREA NITROGEN: FLIGHT 3
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	17.2	16.5	19.2	19.7	16.5	17.4
46	13.8	12.5	21.4	19.7	14.0	16.5
47	18.0	16.3	15.2	19.7	13.4	18.8
48	21.2	15.5	19.5	13.2	16.6	20.5
49	19.3	17.0	12.0	17.8	21.5	22.0
50	19.2	22.0	16.5	13.0	16.6	22.7
51	16.5	11.5	7.3	7.3	11.5	20.2
52	(17.2)	15.5	12.4	13.0	20.5	19.4
53	18.0	17.2	16.1	20.0	19.5	25.6
54	15.8	15.0	18.6	22.2	10.8	21.2
55	18.7	16.0	19.0	21.7	13.6	20.4
56	18.6	15.0	23.0	23.0	24.0	21.2
57	14.6	12.3	11.0	8.6	12.1	17.4
58	15.8	18.0	----	20.3	16.2	17.4
59	(17.2)	(15.5)	14.4	6.8	15.8	21.0
60	12.4	15.4	7.2	8.2	14.8	14.5
61	13.9	15.3	11.4	18.5	21.5	18.9
62	13.1	13.9	9.5	13.6	24.6	18.7
63	12.5	10.5	15.0	11.0	21.6	14.2
64	15.2	19.0	14.1	16.0	18.0	21.7
65	15.3	15.3	21.1	17.0	15.2	22.7
66	13.1	15.6	14.5	23.6	16.0	18.0
96	18.8	26.3	17.8	17.3	24.8	22.0
97	18.2	18.3	19.7	17.0	23.3	18.9
98	15.4	19.6	19.5	14.0	21.8	25.4

TABLE AII.40

SERUM UREA NITROGEN: FLIGHT 4
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	14.5	18.6	15.6	11.0	16.5	14.8
68	13.2	15.5	18.7	15.8	25.5	----
69	13.4	17.2	13.6	14.1	22.2	22.8
70	16.8	18.5	20.5	20.4	18.0	15.5
71	16.1	18.6	12.8	13.1	17.0	20.7
72	15.6	17.5	11.6	13.4	21.7	20.0
73	23.3	16.5	9.9	7.6	----	----
74	23.0	25.5	11.9	11.9	16.5	22.4
75	19.8	20.8	24.1	24.9	18.0	25.0
76	19.0	24.5	11.5	21.6	16.2	26.0

TABLE AII.40 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
77	11.7	15.2	32.5	----	----	----
78	13.4	19.0	29.0	23.6	13.0	22.0
79	15.4	14.4	11.0	12.3	19.0	19.0
80	16.9	18.3	33.5	14.9	19.7	13.7
81	16.8	20.6	12.8	9.2	23.4	23.5
82	(16.3)	21.3	18.8	----	----	19.0
83	14.0	13.5	18.0	13.3	14.0	14.5
84	14.8	17.3	18.8	16.0	19.7	21.5
85	14.0	21.7	21.0	16.0	15.0	16.4
86	16.0	19.9	22.5	17.5	19.7	20.5
87	18.4	18.0	16.7	----	----	16.4
88	15.6	18.3	----	----	----	----
99	12.7	18.6	19.2	17.5	24.0	14.5
100	19.5	26.3	19.5	22.0	23.0	18.9
101	14.6	16.5	15.6	19.8	13.5	16.7

TABLE AII.41

SERUM CREATININE: FLIGHT 1
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.87	0.74	0.89	0.94	0.75	0.74
2	0.78	0.79	0.83	----	----	0.66
3	0.75	0.74	0.84	0.89	0.71	0.53
4	0.82	0.67	0.95	0.90	0.74	0.69
5	0.78	0.82	0.97	----	----	0.75
6	0.95	0.77	0.89	1.05	0.74	0.91
7	0.70	0.74	0.91	0.90	0.70	0.77
8	0.75	0.73	0.84	0.86	0.69	0.66
9	0.62	0.85	0.81	1.12	0.88	0.86
10	0.66	0.79	0.73	1.30	0.79	0.77
11	0.83	0.90	0.89	1.32	0.84	0.81
12	0.75	0.91	1.16	1.29	0.75	0.99
13	0.80	0.78	0.84	----	----	----
14	0.95	0.99	0.89	0.97	0.71	0.88
15	0.89	0.66	0.91	0.90	0.94	----
16	0.71	0.67	0.73	----	----	----
17	0.75	(0.79)	0.80	1.15	0.61	0.78
18	0.78	0.79	0.77	0.89	0.69	0.71
19	0.82	0.82	0.73	0.92	0.74	0.87
20	0.89	0.81	0.77	----	----	----
21	0.74	0.85	0.87	1.01	0.61	0.78
22	0.75	0.79	0.77	1.05	0.75	0.82
90	0.85	0.72	0.67	0.73	0.74	0.87
91	0.77	0.64	0.64	0.71	0.74	0.87
92	0.78	0.66	0.87	0.88	0.79	0.89

TABLE AII.42

SERUM CREATININE: FLIGHT 2
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.75	0.74	0.87	1.00	0.73	0.67
24	0.74	0.75	0.72	0.89	0.68	----
25	0.80	0.79	0.81	0.75	0.65	0.67
26	0.86	0.71	0.96	0.79	0.66	0.66
27	0.66	0.73	0.77	0.67	0.64	0.66
28	0.75	0.79	1.04	0.94	0.73	0.53
29	0.86	0.79	1.01	1.07	0.73	0.74
30	(0.79)	0.89	0.91	1.36	0.82	0.79
31	0.82	0.79	0.77	0.71	0.66	0.75
32	0.82	0.80	0.87	1.00	0.88	0.67
33	0.71	0.72	0.92	1.15	0.73	0.76
34	0.74	0.75	0.77	0.99	0.71	0.67
35	0.87	0.73	0.95	1.14	0.66	0.91
36	0.78	0.93	0.63	1.07	0.84	0.77
37	0.74	0.91	0.97	1.26	0.81	0.70
38	0.75	0.81	0.87	0.99	0.65	0.66
39	1.00	0.88	1.00	1.00	----	----
40	0.76	(0.81)	----	0.81	0.62	0.68
41	0.87	0.91	1.03	----	----	0.76
42	0.86	0.89	1.01	1.22	0.80	0.86
43	0.76	0.89	1.00	0.90	0.77	0.82
44	0.74	0.81	0.77	0.99	0.88	0.92
93	0.88	----	----	----	----	----
94	0.88	0.76	0.76	0.81	0.69	0.76
95	0.97	0.86	0.91	0.92	0.90	0.93
102	----	----	----	0.64	0.73	0.72

TABLE AII.43

SERUM CREATININE: FLIGHT 3
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.66	0.85	0.81	0.87	0.74	0.85
46	0.87	1.04	1.03	1.06	0.78	0.88
47	0.96	1.08	0.93	1.00	0.93	1.07
48	0.97	1.03	0.95	0.99	0.80	0.90
49	0.75	0.64	0.77	0.87	0.66	0.80
50	0.83	0.79	1.00	1.00	0.82	0.86
51	0.89	0.81	1.00	0.88	0.77	0.85
52	0.69	0.84	0.99	1.14	1.03	1.08
53	0.84	0.72	1.01	0.91	0.92	0.90
54	0.75	0.79	0.87	0.88	0.74	0.78
55	0.63	0.69	0.84	0.87	0.72	0.82
56	0.84	0.76	0.92	0.76	0.81	0.82

TABLE AII.43 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	0.95	0.84	0.86	0.80	0.82	0.85
58	0.73	0.87	----	0.83	0.77	0.94
59	(0.84)	(0.79)	0.93	0.91	0.80	0.88
60	0.63	0.67	0.63	0.61	0.61	0.57
61	1.07	0.79	0.92	0.97	0.74	0.88
62	0.95	0.56	0.95	0.88	0.74	0.70
63	0.95	0.64	0.79	0.99	0.71	0.66
64	1.04	0.89	1.12	1.33	0.84	0.89
65	0.87	0.77	0.88	1.24	0.86	0.81
66	0.91	0.79	0.84	1.00	0.84	0.85
96	0.92	0.87	0.99	0.86	1.03	0.96
97	0.88	0.67	0.76	0.71	0.73	0.81
98	0.84	0.79	0.90	0.87	0.88	0.81

TABLE AII.44

SERUM CREATININE: FLIGHT 4
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.84	0.76	0.88	0.96	0.77	0.72
68	0.83	0.65	0.91	0.91	0.73	----
69	0.75	0.79	0.80	0.87	0.70	0.68
70	0.91	0.73	0.89	1.00	0.91	0.84
71	0.89	0.67	0.88	0.99	0.71	0.78
72	0.95	0.67	0.72	0.92	0.73	0.70
73	0.81	0.76	0.89	1.00	----	----
74	0.62	0.76	1.41	0.88	0.65	0.73
75	0.90	0.78	0.87	0.97	0.65	0.74
76	0.88	0.78	1.07	0.85	0.69	0.68
77	0.84	0.68	1.30	----	----	----
78	0.73	0.76	0.96	0.91	0.60	0.73
79	0.76	0.70	0.72	0.83	0.70	0.74
80	0.96	0.90	0.73	1.14	0.77	0.97
81	1.14	0.91	0.97	1.01	0.95	0.99
82	0.69	0.66	0.83	----	----	0.81
83	0.78	0.67	0.80	0.92	0.77	0.71
84	0.73	0.66	0.76	0.88	0.73	0.72
85	0.69	0.60	1.09	0.74	0.71	0.72
86	0.88	0.78	0.77	0.75	0.71	0.73
87	0.62	0.72	1.10	----	----	0.72
88	0.77	0.78	----	----	----	----
99	0.88	0.94	0.87	0.87	0.88	0.83
100	0.97	0.94	0.93	1.04	1.03	0.99
101	0.67	0.76	0.78	0.65	0.68	0.73

TABLE AII.45

SERUM TOTAL CHOLESTEROL: FLIGHT 1
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	215	165	180	232	136	165
2	94	136	160	---	---	157
3	155	132	165	139	111	176
4	85	95	118	110	90	197
5	165	158	112	---	---	165
6	159	188	152	138	110	183
7	161	165	123	126	99	166
8	87	114	69	65	79	73
9	95	158	170	190	126	150
10	144	114	131	155	108	201
11	228	235	263	278	175	269
12	233	195	225	263	135	221
13	138	130	183	---	---	---
14	178	205	197	165	145	225
15	180	195	173	125	119	---
16	106	131	135	---	---	---
17	159	(159)	153	145	137	200
18	145	197	198	139	138	225
19	130	172	168	157	70	121
20	125	133	140	---	---	---
21	158	140	162	138	157	139
22	194	182	165	125	102	173
90	145	129	139	132	143	136
91	174	127	107	123	103	130
92	193	167	125	170	150	150

TABLE AII.46

SERUM TOTAL CHOLESTEROL: FLIGHT 2
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	165	182	195	161	95	210
24	168	175	280	237	163	---
25	155	163	240	199	154	207
26	217	269	182	285	230	245
27	130	158	80	110	105	86
28	175	187	85	125	80	118
29	113	123	139	122	74	120
30	141	185	110	136	142	109
31	140	167	237	149	98	131
32	139	135	168	242	110	113
33	97	115	128	130	85	83
34	184	190	221	213	142	216

TABLE AII.46 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	165	213	205	176	150	171
36	139	190	125	147	112	179
37	149	178	130	103	142	105
38	132	118	116	109	132	205
39	112	123	115	106	---	---
40	83	(165)	---	131	137	115
41	117	125	152	---	---	91
42	128	138	159	139	112	100
43	95	115	136	143	150	96
44	161	210	183	116	154	175
93	201	---	---	---	---	---
94	137	118	107	156	117	124
95	185	137	125	194	135	217
102	---	---	---	142	125	166

TABLE AII.47

SERUM TOTAL CHOLESTEROL: FLIGHT 3
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	155	153	225	121	158	135
46	121	125	176	140	173	163
47	165	180	325	267	197	214
48	161	175	232	154	178	196
49	200	217	217	197	170	228
50	177	191	191	186	249	129
51	150	144	110	95	143	115
52	213	165	169	98	169	208
53	215	125	260	225	238	192
54	192	113	230	219	238	144
55	123	162	170	194	195	135
56	147	115	192	164	134	194
57	197	184	218	168	159	212
58	117	123	---	105	175	135
59	(165)	(150)	145	83	143	93
60	123	103	116	87	130	179
61	143	125	163	159	165	116
62	197	188	220	213	172	120
63	125	107	170	127	146	110
64	255	150	225	218	219	165
65	113	170	206	155	180	116
66	169	140	187	114	143	120
96	120	123	114	164	155	190
97	156	163	146	155	94	145
98	165	173	133	148	123	201

TABLE AII.48

SERUM TOTAL CHOLESTEROL: FLIGHT 4
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	139	145	262	255	179	189
68	110	130	212	172	126	—
69	150	133	257	265	149	143
70	215	215	336	176	249	315
71	194	160	190	163	165	146
72	195	143	178	176	164	168
73	157	137	110	118	—	—
74	194	162	197	88	193	235
75	144	117	237	208	170	101
76	128	124	245	188	143	161
77	105	116	93	—	—	—
78	169	129	260	217	121	156
79	139	134	212	140	99	140
80	203	190	166	274	205	185
81	175	135	176	195	156	123
82	(155)	107	233	—	—	146
83	186	178	233	179	170	180
84	130	131	208	132	145	133
85	143	99	205	107	120	97
86	126	121	203	142	101	110
87	139	166	265	—	—	231
88	123	139	—	—	—	—
99	163	150	163	165	143	157
100	165	106	130	124	122	165
101	97	112	95	120	104	110

TABLE AII.49

WHOLE BLOOD GLUCOSE: FLIGHT 1
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	65	62	62	60	67	82
2	52	45	—	—	—	67
3	52	51	42	58	67	71
4	50	57	51	65	65	76
5	61	60	80	—	—	80
6	65	62	72	61	72	75
7	48	47	62	56	63	68
8	56	52	68	65	72	68
9	50	62	57	47	67	63
10	65	63	52	46	75	70

TABLE AII.49 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
11	58	58	62	50	67	66
12	45	53	55	46	60	61
13	60	58	55	--	--	--
14	60	48	51	46	72	60
15	65	56	56	55	70	--
16	60	52	60	--	--	--
17	67	(56)	65	56	75	66
18	62	57	56	56	58	58
19	67	55	78	66	62	66
20	60	58	75	--	--	--
21	68	62	80	62	73	62
22	75	60	85	70	75	77
90	75	65	82	75	70	75
91	65	47	70	57	61	63
92	67	45	70	62	62	56

TABLE AII.50

WHOLE BLOOD GLUCOSE: FLIGHT 2
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	65	61	70	57	73	70
24	68	57	65	55	68	--
25	48	55	60	41	67	61
26	62	57	67	50	76	76
27	50	47	67	60	68	62
28	67	62	84	73	84	73
29	62	57	87	76	67	77
30	(59)	57	84	72	71	77
31	57	57	82	70	76	71
32	52	50	66	48	75	70
33	62	63	82	57	77	76
34	58	56	84	55	75	71
35	63	60	71	55	77	77
36	66	50	73	53	70	75
37	56	53	70	61	68	71
38	55	42	68	53	62	68
39	55	53	72	57	--	--
40	60	(54)	--	72	80	77
41	57	50	--	--	--	77
42	60	55	84	67	82	87
43	52	47	88	60	65	70
44	55	52	94	68	72	75
93	60	--	--	--	--	--

TABLE AII.50 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
94	54	52	94	73	63	80
95	58	56	90	75	77	78
102	--	--	--	67	81	76

TABLE AII.51

WHOLE BLOOD GLUCOSE: FLIGHT 3
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	71	58	50	45	82	85
46	60	55	55	47	73	75
47	68	57	51	47	78	87
48	67	57	50	52	80	87
49	52	57	70	62	77	85
50	66	62	80	65	81	82
51	56	57	72	63	73	76
52	72	61	78	67	77	84
53	58	55	81	52	73	84
54	60	57	62	53	80	77
55	67	60	72	55	76	77
56	55	57	70	63	82	83
57	57	57	57	55	73	75
58	63	62	--	67	72	81
59	(62)	(56)	61	58	76	75
60	66	56	70	58	73	80
61	65	51	67	57	77	84
62	56	57	71	61	72	75
63	72	66	80	75	78	94
64	62	43	65	62	70	77
65	55	45	68	55	80	71
66	65	50	75	63	81	70
96	72	57	89	67	81	78
97	66	56	77	62	77	82
98	75	53	76	60	75	83

TABLE AII.52

WHOLE BLOOD GLUCOSE: FLIGHT 4
(mg/100 ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	60	53	40	51	75	81
68	60	57	45	70	78	--
69	55	48	45	45	75	80
70	58	52	51	66	77	82

TABLE AII.52 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
71	61	50	68	66	82	87
72	61	62	72	65	80	82
73	56	52	72	62	--	--
74	57	42	72	61	78	80
75	62	55	57	50	76	82
76	62	55	48	47	77	83
77	51	42	--	--	--	--
78	62	47	57	55	77	81
79	50	50	50	51	80	82
80	(57)	45	48	48	70	80
81	56	47	62	60	77	73
82	(57)	50	60	--	72	73
83	55	50	60	57	--	77
84	58	47	63	57	77	76
85	58	42	--	57	81	78
86	52	50	66	61	76	78
87	60	50	--	--	--	76
88	52	42	--	--	--	--
99	60	52	73	68	75	66
100	65	53	70	65	85	83
101	67	56	75	72	80	75

TABLE AII.53

ERYTHROCYTE SEDIMENTATION RATE: FLIGHT 1
(mm/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.75	----	0.66	----	0.16	0.35
2	0.40	0.06	----	----	----	0.13
3	0.08	0.58	0.68	0.88	1.19	1.56
4	0.24	0.28	0.28	0.10	0.09	0.21
5	0.78	1.42	0.80	----	----	0.66
6	0.05	0.08	0.15	0.19	0.06	0.12
7	0.23	0.35	0.18	0.18	0.59	0.69
8	0.09	0.50	0.13	0.12	0.14	0.21
9	0.10	0.09	0.22	0.06	0.08	0.10
10	0.11	0.25	0.36	0.20	0.14	0.34
11	0.10	----	0.65	0.62	0.41	0.56
12	1.92	0.95	1.10	1.12	1.03	1.16
13	0.02	0.06	0.26	----	----	----
14	0.80	0.58	0.88	0.84	0.98	0.80
15	0.49	0.70	0.70	0.98	0.96	----
16	0.40	0.50	0.34	----	----	----
17	0.36	----	1.00	0.42	0.33	0.66
18	0.03	0.31	0.36	0.20	0.25	0.80

TABLE AII.53 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
19	0.41	0.75	0.38	0.22	0.23	1.10
20	0.34	0.21	0.55	----	----	----
21	0.56	0.68	1.00	0.76	0.72	1.12
22	0.50	0.25	0.27	----	0.29	0.16
90	0.25	0.48	0.41	0.29	0.41	0.33
91	0.03	0.08	0.15	0.08	0.08	0.12
92	0.21	0.06	0.19	0.02	0.16	0.16

TABLE AII.54

ERYTHROCYTE SEDIMENTATION RATE: FLIGHT 2
(mm/hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.10	0.20	0.30	0.31	0.10	0.25
24	0.15	0.06	0.27	0.21	0.10	----
25	0.43	0.38	0.70	0.92	0.50	0.45
26	0.58	0.24	0.30	0.42	0.17	0.32
27	0.57	0.25	0.82	----	0.58	0.35
28	0.65	0.35	0.58	0.55	0.26	0.37
29	0.82	0.42	0.20	0.37	0.20	0.47
30	----	0.25	0.30	0.38	0.27	0.38
31	0.33	0.22	0.86	0.25	0.22	0.25
32	0.89	0.40	0.78	1.22	0.62	0.34
33	0.57	0.24	0.47	0.32	0.15	0.40
34	0.08	----	0.42	0.48	0.11	0.25
35	0.43	0.49	0.38	0.38	0.12	0.50
36	1.20	0.49	0.95	0.68	0.76	0.79
37	0.83	0.55	0.65	0.24	0.44	0.62
38	0.62	0.58	0.93	0.70	1.03	0.55
39	0.15	0.22	----	----	----	----
40	0.61	----	----	0.11	0.12	0.28
41	0.15	0.12	----	----	----	0.09
42	0.14	0.30	0.44	0.47	0.17	0.40
43	0.06	0.40	0.30	0.28	0.10	0.08
44	0.14	0.42	0.63	0.58	0.88	0.68
93	0.36	----	----	----	----	----
94	0.26	0.37	0.26	0.27	0.58	0.30
95	0.43	0.39	0.62	0.58	0.42	0.62
102	----	----	----	0.65	0.42	0.72

TABLE AII.55

ERYTHROCYTE SEDIMENTATION RATE: FLIGHT 3
(mm/hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.35	0.26	0.34	0.19	0.22	0.20
46	0.70	1.46	1.23	0.58	0.11	0.16
47	0.12	0.11	0.18	0.06	0.12	0.26
48	0.95	0.60	0.89	0.43	0.20	0.31
49	0.60	0.34	0.46	0.06	0.36	0.45
50	0.68	0.61	0.58	0.44	0.61	0.54
51	0.21	0.12	0.16	0.08	0.28	0.15
52	0.17	0.16	0.25	----	0.32	0.24
53	0.30	0.15	0.42	0.18	0.26	0.30
54	0.42	0.32	0.40	0.34	0.26	0.38
55	0.95	1.05	1.20	0.47	0.52	1.14
56	0.72	0.42	1.14	0.84	0.20	0.42
57	0.60	0.44	1.28	0.50	0.31	0.49
58	0.30	----	----	----	----	0.35
59	----	----	1.19	0.66	0.63	0.48
60	0.11	0.48	0.20	0.14	0.16	0.23
61	0.16	0.17	0.72	0.38	0.26	0.26
62	0.79	0.72	0.88	0.65	----	0.89
63	1.30	0.32	1.01	0.17	0.13	0.22
64	0.48	0.38	0.52	0.74	1.48	0.65
65	0.09	0.16	0.27	0.18	0.12	0.20
66	0.09	0.05	0.13	0.12	0.08	0.07
96	0.20	0.22	0.15	0.22	0.14	0.23
97	0.17	0.39	0.24	0.97	0.12	0.10
98	0.68	0.03	0.16	0.09	0.16	0.24

TABLE AII.56

ERYTHROCYTE SEDIMENTATION RATE: FLIGHT 4
(mm/hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.15	0.19	0.24	0.16	0.02	0.20
68	0.36	0.94	0.84	0.25	0.06	----
69	0.84	0.65	0.77	0.48	0.25	0.55
70	0.34	0.36	0.30	0.04	0.06	0.31
71	0.70	0.99	0.58	0.24	0.24	0.58
72	0.75	0.60	----	0.19	0.22	0.26
73	0.24	0.36	0.20	0.09	----	----
74	0.46	0.42	0.28	0.58	0.25	0.35
75	0.20	0.58	0.32	0.24	0.15	0.30
76	0.34	0.41	0.47	0.16	0.18	0.24
77	0.75	0.61	----	----	----	----
78	0.39	0.17	0.17	0.16	0.16	0.11
79	1.20	0.16	0.17	0.08	0.11	0.36

TABLE AII.56 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
80	----	0.50	0.61	0.26	0.23	0.63
81	0.44	0.33	0.30	0.10	0.20	0.31
82	----	0.02	0.12	----	----	0.08
83	0.67	0.45	0.75	0.40	0.31	0.64
84	0.41	0.30	0.30	0.04	0.31	0.30
85	0.21	0.25	----	0.12	0.23	0.16
86	0.70	0.36	0.32	0.06	0.12	0.08
87	0.18	0.21	----	----	----	0.30
88	0.15	0.40	----	----	----	----
99	0.19	0.26	0.47	0.28	0.30	0.68
100	0.42	0.40	0.28	0.12	0.19	0.12
101	0.26	0.20	0.46	0.20	0.15	0.16

TABLE AII.57

HEMATOCRIT: FLIGHT 1
(Vol. per cent)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	44.9	48.5	49.0	----	43.1	43.1
2	44.9	49.3	----	----	----	45.6
3	42.2	41.0	44.7	41.6	40.0	40.0
4	42.7	46.0	46.4	43.2	43.6	42.6
5	44.4	46.5	47.5	----	----	43.6
6	48.4	47.8	47.5	44.5	42.8	43.5
7	50.5	52.4	49.5	49.5	47.5	51.5
8	43.1	49.0	44.2	41.6	43.6	44.0
9	44.0	43.6	46.7	44.5	45.7	45.5
10	41.4	42.2	46.6	46.0	42.0	46.0
11	44.9	46.5	46.5	44.5	44.6	43.1
12	46.8	47.5	47.0	47.0	45.5	44.5
13	41.4	46.0	45.1	----	----	----
14	49.2	50.5	50.0	46.6	47.5	45.0
15	45.8	47.5	47.5	43.6	46.5	----
16	40.0	42.0	41.5	----	----	----
17	43.6	----	47.0	43.6	41.7	43.0
18	44.0	45.5	46.3	43.2	44.8	45.1
19	45.3	43.9	45.0	42.4	42.1	45.0
20	43.1	43.5	46.1	----	----	----
21	45.2	47.0	47.5	44.5	45.6	47.0
22	43.6	43.7	44.8	46.5	41.3	40.9
90	43.8	48.0	45.1	42.6	44.2	42.0
91	45.3	47.0	49.0	46.0	47.2	47.0
92	43.1	41.8	45.2	43.6	44.5	43.1

TABLE AII.58

HEMATOCRIT: FLIGHT 2
(Vol. per cent)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	44.9	45.0	49.6	50.5	44.9	43.0
24	39.6	38.8	44.0	44.0	38.7	----
25	37.3	38.6	42.0	43.6	38.5	38.1
26	44.4	44.5	47.5	47.5	44.6	42.1
27	44.0	44.5	46.8	45.5	44.0	43.0
28	46.2	42.7	47.3	47.0	43.6	43.9
29	45.8	43.6	46.0	46.5	43.1	45.5
30	----	43.1	46.0	45.5	44.0	42.9
31	42.7	44.0	50.5	43.1	43.3	43.4
32	43.6	41.6	46.0	47.0	45.5	42.9
33	56.8	44.8	47.0	45.1	45.0	45.0
34	44.9	48.0	48.5	46.1	47.0	46.6
35	45.3	48.5	47.5	47.6	47.0	45.0
36	40.4	39.0	43.0	43.6	42.5	46.5
37	43.7	40.2	42.0	36.6	43.4	43.0
38	43.1	39.6	45.5	42.4	44.5	45.0
39	40.6	43.1	42.5	45.5	----	----
40	46.2	----	----	44.0	45.0	46.1
41	42.7	40.3	----	----	----	43.4
42	41.4	46.3	44.5	44.0	42.1	44.9
43	40.7	43.1	47.0	46.0	45.0	47.0
44	40.5	45.6	44.1	42.7	42.9	43.0
93	42.7	----	----	----	----	----
94	40.5	42.0	42.0	43.6	43.1	43.0
95	43.1	44.6	45.9	46.5	47.5	45.5
102	----	----	----	45.0	47.0	43.4

TABLE AII.59

HEMATOCRIT: FLIGHT 3
(Vol. per cent)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	41.8	41.9	46.6	45.4	41.1	40.6
46	41.4	39.6	47.5	46.8	41.6	42.1
47	43.1	44.6	47.5	47.5	41.5	42.0
48	41.4	41.2	44.4	46.0	40.6	41.5
49	44.9	42.5	47.5	40.6	43.5	42.0
50	46.6	43.9	47.5	48.5	43.9	44.8
51	45.3	45.3	48.5	48.5	46.5	45.0
52	49.6	50.0	54.0	50.0	47.5	49.0
53	44.9	42.7	46.5	47.5	43.6	43.0

TABLE AII.59 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
54	45.8	47.0	51.0	48.5	43.3	44.0
55	44.9	46.5	50.0	48.0	45.6	44.4
56	41.4	41.5	46.5	47.0	40.4	42.5
57	48.3	46.0	49.0	50.0	45.4	46.0
58	44.9	44.1	----	46.0	43.0	44.9
59	----	----	49.5	45.5	45.0	43.0
60	41.8	39.6	45.1	43.5	41.0	42.1
61	47.9	43.5	50.5	49.3	47.0	47.0
62	44.4	44.5	48.5	49.0	45.5	46.8
63	42.2	40.0	47.5	44.5	43.0	43.1
64	44.9	43.1	47.0	45.5	44.5	44.9
65	43.8	43.6	48.0	48.5	46.0	47.5
66	46.4	44.4	50.5	47.5	46.5	47.0
96	37.0	38.9	38.4	45.5	38.1	39.9
97	43.1	44.4	48.5	48.0	46.5	46.0
98	41.8	36.4	43.9	44.1	43.1	42.6

TABLE AII.60

HEMATOCRIT: FLIGHT 4
(Vol. per cent)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	41.2	42.0	48.0	47.5	39.0	40.5
68	44.0	46.8	49.0	46.6	42.5	----
69	42.7	43.6	48.5	47.0	41.6	41.7
70	42.9	41.8	48.0	43.1	43.6	43.6
71	44.9	46.5	51.5	48.0	46.0	47.0
72	41.8	42.6	46.1	44.0	42.9	44.0
73	43.6	42.0	45.3	42.0	----	----
74	45.3	43.6	46.5	44.0	42.6	45.0
75	40.9	43.1	43.9	44.1	41.7	43.0
76	44.4	44.2	49.0	47.1	43.9	44.0
77	41.8	42.8	----	----	----	----
78	44.4	43.1	51.5	48.0	43.1	44.4
79	45.8	48.0	51.0	50.5	47.5	48.5
80	----	43.6	52.5	51.0	43.1	44.5
81	44.4	46.1	46.5	44.6	45.0	48.0
82	----	41.0	43.5	----	----	43.1
83	44.0	43.4	47.5	45.1	43.0	46.1
84	44.0	46.7	47.5	44.6	45.3	48.5
85	45.8	40.0	----	47.5	47.0	48.5
86	42.7	44.0	45.0	42.6	43.0	44.0
87	44.9	45.4	----	----	----	49.0
88	42.2	42.9	----	----	----	----
99	41.8	42.1	46.0	45.1	41.0	47.0
100	42.7	42.8	44.3	45.5	44.5	46.0
101	41.8	44.3	46.5	46.0	45.0	44.5

TABLE AII.61

TOTAL WHITE BLOOD CELL COUNT: FLIGHT 1
(thousands/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	10.70	10.15	7.90	8.25	5.90	7.30
2	8.60	7.60	-----	-----	-----	6.05
3	8.05	8.95	6.45	8.20	7.30	8.90
4	11.85	10.50	9.30	9.80	7.70	9.50
5	12.00	11.15	9.95	-----	-----	10.00
6	8.10	7.20	5.60	6.50	6.20	5.45
7	11.00	9.75	7.50	8.30	8.70	10.55
8	9.25	8.50	7.70	8.60	9.00	9.60
9	6.80	8.20	6.40	8.55	6.60	5.80
10	9.80	8.45	7.50	11.50	8.25	7.40
11	13.50	16.45	13.05	13.70	10.10	8.80
12	13.50	17.20	17.50	19.50	15.30	11.85
13	8.35	7.30	8.10	-----	-----	-----
14	6.65	8.00	6.15	6.45	7.15	6.50
15	9.65	6.85	5.35	5.30	6.60	-----
16	7.75	6.90	5.20	-----	-----	-----
17	8.05	(9.42)	8.55	8.80	7.25	8.00
18	9.25	9.60	9.25	10.45	10.05	8.30
19	15.50	10.00	10.35	11.70	12.00	13.45
20	8.75	7.10	4.30	-----	-----	-----
21	11.35	12.00	9.80	13.60	10.75	11.05
22	8.50	6.05	7.25	8.10	7.45	8.15
90	6.60	5.05	5.10	6.45	4.55	4.45
91	9.65	7.15	6.00	7.75	8.40	9.85
92	12.10	9.50	10.45	11.25	11.00	11.30

TABLE AII.62

TOTAL WHITE BLOOD CELL COUNT: FLIGHT 2
(thousands/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	7.90	8.75	6.65	6.35	7.40	7.00
24	7.25	5.45	3.75	6.40	6.60	-----
25	5.40	10.25	7.20	7.00	5.30	5.65
26	10.75	9.25	6.10	8.75	6.00	4.85
27	10.75	8.95	8.45	7.85	7.55	9.30
28	6.80	5.95	6.00	9.20	5.20	6.45
29	11.15	9.40	10.00	9.50	8.75	11.95
30	(8.88)	8.05	10.20	10.25	7.30	9.70
31	9.60	8.95	11.80	10.10	9.40	11.35
32	12.00	9.40	9.80	13.90	7.20	9.95
33	8.30	7.15	6.80	10.00	9.50	9.45

TABLE AII.62 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
34	8.00	7.80	5.20	9.25	6.85	8.85
35	9.70	8.55	7.85	9.20	8.40	9.75
36	9.10	11.80	14.30	13.40	12.85	12.05
37	6.90	7.60	6.95	6.90	7.20	7.55
38	13.55	11.00	17.20	12.55	10.90	9.60
39	8.40	8.15	6.15	6.50	-----	-----
40	9.65	(8.33)	-----	11.40	9.60	8.50
41	7.85	8.00	-----	-----	-----	11.60
42	6.50	7.70	8.45	8.10	4.90	6.50
43	9.60	6.50	9.90	8.45	8.85	9.50
44	7.30	6.20	10.60	10.35	8.20	9.00
93	11.00	-----	-----	-----	-----	-----
94	19.70	14.15	12.80	13.70	13.45	14.75
95	7.45	7.20	6.50	7.45	6.45	6.95
102	-----	-----	-----	12.80	8.40	8.25

TABLE AII.63

TOTAL WHITE BLOOD CELL COUNT: FLIGHT 3
(thousands/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	12.35	7.00	6.40	5.55	5.10	5.45
46	11.50	10.70	7.30	6.10	6.85	8.00
47	9.75	9.20	8.10	6.00	6.80	7.40
48	10.50	7.95	7.00	6.75	7.70	9.10
49	7.85	9.35	5.20	6.85	7.70	7.25
50	9.10	7.30	5.70	7.45	5.20	7.75
51	6.30	5.65	6.00	5.10	4.25	6.70
52	7.85	6.20	6.15	6.70	4.55	8.45
53	7.50	8.00	5.40	6.00	7.55	6.15
54	11.60	13.40	10.95	10.70	9.35	13.20
55	13.35	10.35	9.95	10.35	8.60	8.90
56	12.00	9.75	7.55	7.75	6.80	9.05
57	9.60	7.95	8.20	7.80	7.75	8.30
58	7.00	7.70	-----	7.45	6.10	8.90
59	(9.10)	(8.62)	5.65	6.25	8.90	8.75
60	9.30	8.15	6.90	5.90	8.30	7.80
61	7.55	8.90	5.85	4.50	5.70	7.10
62	9.95	8.75	8.00	7.10	7.35	7.25
63	13.40	12.40	10.60	9.85	10.70	10.10
64	9.15	5.40	4.75	4.20	5.90	8.00
65	10.50	8.00	4.45	6.10	6.25	7.85
66	7.50	8.90	8.70	7.25	8.90	9.90
96	7.80	4.40	5.00	4.40	5.45	5.00
97	6.50	6.90	7.50	9.50	6.95	7.00
98	5.30	6.20	7.80	6.70	7.80	8.00

TABLE AII.64

TOTAL WHITE BLOOD CELL COUNT: FLIGHT 4
(thousands/mm3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	12.00	9.40	6.15	7.30	7.45	8.35
68	7.55	7.80	4.05	3.90	4.55	-----
69	10.55	10.10	7.65	6.30	7.35	6.20
70	10.05	9.35	8.20	7.20	7.15	9.95
71	7.15	6.85	4.30	4.60	7.15	8.15
72	11.25	10.05	7.00	9.70	9.70	12.35
73	10.50	8.75	9.60	8.10	-----	-----
74	10.05	7.75	5.90	6.40	7.70	4.20
75	9.30	12.30	4.85	6.15	8.45	8.95
76	7.50	8.35	4.45	5.25	6.90	7.55
77	9.95	9.80	-----	-----	-----	-----
78	7.60	8.40	6.85	4.20	6.60	6.10
79	10.10	9.15	7.85	6.40	8.85	10.40
80	(9.67)	6.60	3.95	3.55	4.50	5.90
81	6.60	6.25	4.25	3.90	5.60	6.10
82	(9.67)	7.40	6.40	-----	-----	8.80
83	7.95	7.10	6.30	5.15	6.20	8.15
84	9.70	12.00	7.30	7.70	8.25	11.05
85	11.40	8.80	-----	5.05	6.80	7.30
86	13.45	10.30	7.20	7.65	9.80	8.95
87	8.95	7.50	-----	-----	-----	7.15
88	10.95	11.60	-----	-----	-----	-----
99	4.85	5.80	7.00	5.90	5.50	5.00
100	11.85	10.75	13.50	13.00	10.65	10.90
101	9.85	9.80	11.30	8.30	10.45	7.90

TABLE AII.65

NEUTROPHIL COUNT: FLIGHT 1
(thousands/mm3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	6.96	4.26	3.79	----	1.94	3.72
2	4.38	4.26	----	----	----	2.90
3	5.15	5.82	3.74	4.43	3.21	4.54
4	7.11	6.72	5.30	4.31	3.46	5.13
5	7.44	7.14	3.38	----	----	5.40
6	4.13	4.46	2.74	3.18	3.16	2.99
7	6.38	6.44	3.98	5.15	5.13	6.22
8	5.64	3.82	3.03	4.04	3.69	2.88
9	4.56	4.51	3.84	4.79	2.84	2.44
10	3.53	4.48	3.22	6.90	4.12	4.29
11	8.78	11.35	7.83	8.49	6.56	3.70

TABLE AII.65 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
12	7.96	12.73	8.92	13.26	11.17	7.82
13	4.34	3.80	3.24	----	----	----
14	2.66	3.84	2.40	2.77	2.64	2.28
15	4.34	3.36	1.50	1.27	2.24	----
16	4.11	3.10	1.92	----	----	----
17	3.54	(5.14)	3.85	3.70	2.97	3.84
18	5.09	5.18	4.35	4.49	6.83	4.98
19	8.22	5.20	5.80	5.50	5.40	7.13
20	4.38	2.70	1.29	----	----	----
21	6.70	3.24	5.39	5.17	5.70	5.86
22	4.16	1.99	3.92	1.94	2.98	3.91
90	3.50	2.32	1.94	2.45	1.82	2.85
91	5.50	3.00	2.76	2.09	4.37	6.99
92	7.38	4.66	6.58	5.74	6.82	6.10

TABLE AII.66

NEUTROPHIL COUNT: FLIGHT 2
(thousands/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	4.03	4.90	3.86	3.36	4.14	2.03
24	2.32	2.18	1.39	1.79	2.05	----
25	2.59	5.33	3.53	3.08	2.38	2.60
26	4.52	3.98	2.68	4.02	2.34	1.55
27	6.13	4.92	5.41	3.22	4.23	5.95
28	3.67	2.44	2.76	3.86	2.60	2.90
29	5.24	5.55	5.20	3.99	4.29	6.57
30	(4.31)	4.59	4.39	5.33	3.07	4.17
31	5.66	5.46	6.73	5.56	5.17	5.90
32	6.48	5.64	5.98	8.76	2.59	5.07
33	4.40	4.08	2.59	4.30	4.84	5.20
34	4.64	3.90	3.07	3.98	2.81	4.07
35	4.66	5.30	4.79	4.05	3.95	4.88
36	4.37	8.50	9.15	5.09	7.97	6.51
37	3.73	4.41	3.89	2.21	4.39	3.17
38	6.37	6.82	9.12	6.15	6.10	5.18
39	1.55	5.05	3.38	3.51	----	----
40	5.02	(4.61)	----	4.56	5.09	4.25
41	3.06	4.40	----	----	----	3.94
42	3.64	3.77	3.38	1.94	1.91	3.06
43	5.09	2.86	5.54	3.30	3.80	1.71
44	3.28	2.79	4.56	4.55	4.35	4.05
93	5.61	----	----	----	----	----
94	13.99	10.33	7.30	8.49	7.94	8.11
95	2.98	2.66	2.47	2.38	2.52	2.64
102	----	----	----	6.91	4.62	4.04

TABLE AII.67

NEUTROPHIL COUNT: FLIGHT 3
(thousands/mm3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	6.05	3.29	3.78	1.72	1.89	1.74
46	5.75	7.92	3.72	3.54	3.56	4.32
47	4.78	3.31	3.40	2.76	3.13	3.18
48	4.94	4.53	3.57	4.66	3.39	4.55
49	3.77	4.96	3.29	3.97	4.70	4.28
50	4.10	3.94	3.14	3.87	3.02	4.42
51	3.46	3.12	3.82	2.04	2.08	3.42
52	1.96	2.79	1.84	2.14	0.91	3.04
53	3.82	2.48	2.92	2.94	4.23	3.63
54	6.50	6.97	4.49	4.71	5.89	7.00
55	8.01	6.73	5.07	5.90	4.90	4.98
56	6.00	5.17	4.08	3.87	2.92	6.15
57	7.01	5.17	5.08	4.45	4.50	5.02
58	2.59	4.47	----	3.87	2.56	4.27
59	(4.75)	(4.58)	2.66	3.00	4.27	4.99
60	3.91	3.91	3.31	2.48	5.48	4.13
61	5.13	2.67	1.87	0.45	1.31	2.20
62	5.57	5.25	5.36	3.76	4.56	3.04
63	3.75	7.19	7.00	4.83	3.96	5.25
64	3.02	2.59	1.81	2.35	1.89	4.00
65	5.25	4.56	2.36	2.32	3.19	4.16
66	4.42	5.16	4.44	4.20	4.81	5.74
96	2.11	1.67	1.60	1.28	2.23	1.50
97	3.06	2.55	2.63	3.99	2.50	3.01
98	2.77	3.84	4.13	3.82	4.60	4.56

TABLE AII.68

NEUTROPHIL COUNT: FLIGHT 4
(thousands/mm3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	6.72	5.08	3.08	2.48	4.02	4.01
68	4.00	2.18	1.26	0.66	1.41	----
69	7.49	6.67	4.90	4.16	4.41	3.60
70	5.23	4.21	3.28	2.30	2.57	4.68
71	2.57	3.01	1.63	1.24	1.86	4.16
72	4.28	4.72	2.80	4.95	5.34	5.43
73	6.82	4.72	4.32	4.78	----	----
74	4.62	4.03	2.66	2.24	3.46	6.26
75	4.93	8.12	2.91	2.83	3.55	5.01
76	3.75	4.59	1.78	2.26	4.35	4.53
77	3.38	4.70	----	----	----	----

TABLE AII.68 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
78	3.88	4.70	3.49	2.31	4.03	3.48
79	4.04	4.12	4.16	2.05	3.81	5.41
80	----	2.64	0.24	0.96	1.35	1.42
81	3.30	2.50	1.36	1.60	2.18	3.05
82	(4.97)	3.77	2.88	----	----	2.90
83	4.77	3.48	2.33	2.11	3.22	4.81
84	5.24	6.48	3.36	4.39	4.21	6.41
85	6.95	4.58	----	2.27	4.49	3.36
86	9.15	5.56	3.17	3.52	5.29	5.46
87	5.46	3.08	----	----	----	2.64
88	5.69	6.61	----	----	----	----
99	1.36	1.16	1.89	1.30	2.75	1.95
100	4.86	3.76	5.40	5.98	5.43	4.36
101	5.61	3.63	7.57	----	5.43	2.84

TABLE AII.69

LYMPHOCYTE COUNT: FLIGHT 1
(thousands/mm3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	2.97	4.97	3.87	----	3.78	3.14
2	3.27	2.81	----	----	----	2.72
3	2.10	2.42	2.52	2.79	3.94	3.83
4	3.67	3.36	3.63	5.19	4.00	3.80
5	3.36	3.79	5.97	----	----	4.10
6	3.56	2.52	2.58	3.25	2.85	1.96
7	3.41	2.93	2.40	2.82	3.13	3.80
8	3.05	4.42	4.54	4.30	5.22	6.53
9	2.11	1.89	2.18	3.16	3.17	2.49
10	5.88	3.80	4.12	4.02	3.71	2.22
11	3.92	4.94	4.96	4.38	3.33	4.66
12	3.51	4.30	4.90	5.85	3.67	2.61
13	3.59	2.92	4.78	----	----	----
14	3.19	2.88	3.08	3.10	3.29	3.12
15	4.15	3.22	3.58	3.82	3.96	----
16	3.10	3.73	3.12	----	----	----
17	4.10	(3.59)	4.28	4.66	4.06	3.28
18	3.61	3.46	4.44	5.54	2.71	2.16
19	6.51	4.20	4.04	5.38	5.76	5.51
20	3.32	3.76	2.58	----	----	----
21	4.31	6.12	4.02	6.80	4.19	4.75
22	3.91	3.63	2.68	5.91	4.17	3.59
90	2.71	2.52	2.70	3.87	2.32	1.38
91	3.86	3.65	2.82	4.81	3.28	3.56
92	3.99	4.08	3.24	5.06	3.85	3.28

TABLE AII.70

LYMPHOCYTE COUNT: FLIGHT 2
(thousands/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	3.71	3.59	2.39	2.86	2.89	3.64
24	4.57	3.05	2.01	4.48	4.03	----
25	2.43	4.10	3.46	3.57	2.54	2.49
26	4.30	5.00	3.17	4.11	3.36	3.15
27	2.58	3.85	2.45	4.24	2.87	3.07
28	2.45	3.33	2.88	4.97	2.34	2.71
29	4.91	3.48	4.60	4.94	4.20	4.06
30	(3.59)	2.98	4.90	3.59	2.85	3.88
31	2.30	3.13	4.01	4.14	3.67	4.65
32	5.16	3.67	3.53	4.45	4.18	4.28
33	3.24	2.43	3.81	4.00	3.70	3.21
34	2.48	2.89	1.72	4.35	3.36	3.89
35	3.69	2.82	2.12	4.32	3.61	3.99
36	3.28	2.83	4.15	6.97	4.37	4.70
37	2.62	2.58	2.57	4.55	2.02	4.00
38	6.37	3.63	6.19	5.14	3.49	3.26
39	6.59	2.44	2.46	2.21	----	----
40	3.67	(3.28)	----	6.16	3.74	3.48
41	3.06	3.44	----	----	----	4.64
42	2.08	3.31	4.22	5.75	2.79	3.25
43	2.69	2.92	3.86	4.22	3.98	6.74
44	3.21	3.35	5.09	5.07	3.20	3.69
93	2.86	----	----	----	----	----
94	2.36	3.82	4.22	4.11	4.30	6.20
95	3.65	4.39	3.18	4.40	3.16	3.96
102	----	----	----	4.86	3.44	3.96

TABLE AII.71

LYMPHOCYTE COUNT: FLIGHT 3
(thousands/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	3.58	2.45	1.41	2.61	1.89	2.72
46	4.48	2.35	2.26	2.13	2.81	2.56
47	4.10	5.52	4.13	2.58	3.33	3.77
48	4.62	2.94	2.94	1.69	3.77	4.19
49	3.38	3.83	2.34	2.53	2.54	2.46
50	4.64	3.28	2.05	3.50	2.03	2.64
51	2.71	2.09	2.04	2.50	1.74	2.95
52	5.42	3.04	3.32	3.82	3.09	4.22
53	2.62	4.88	2.11	2.58	2.57	2.21
54	4.06	4.02	5.80	3.53	2.24	2.83
55	5.21	3.21	3.88	3.73	3.18	3.56

TABLE AII.71 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
56	3.24	3.12	2.64	3.41	2.72	2.26
57	2.50	2.39	2.54	2.50	2.87	3.26
58	2.59	2.62	----	3.13	3.05	4.18
59	(3.92)	(3.19)	2.37	2.88	4.09	3.06
60	3.81	4.08	3.24	3.30	2.57	3.43
61	1.89	4.36	3.57	3.92	4.10	4.20
62	2.59	3.32	2.32	2.63	2.57	3.99
63	8.58	4.34	2.23	4.04	5.14	3.94
64	5.76	2.48	2.47	1.51	3.13	3.60
65	4.62	2.80	1.47	3.36	2.38	3.22
66	2.92	2.85	3.31	2.61	2.76	3.86
96	5.30	2.29	3.00	2.95	2.94	3.50
97	3.25	4.21	4.50	5.13	4.10	3.71
98	1.86	1.74	2.89	2.08	2.81	2.80

TABLE AII.72

LYMPHOCYTE COUNT: FLIGHT 4
(thousands/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	4.68	3.57	2.89	4.82	3.35	3.76
68	2.94	4.60	2.11	2.34	2.32	----
69	2.43	3.13	2.37	1.95	2.65	2.36
70	4.32	4.49	4.02	4.39	3.93	4.08
71	3.79	3.56	2.41	3.04	4.29	3.50
72	6.19	4.52	3.57	3.69	3.01	5.19
73	3.04	3.85	3.84	3.00	----	----
74	5.12	3.56	3.13	3.97	3.39	2.67
75	4.00	3.81	1.75	2.95	4.48	3.49
76	3.45	3.02	2.58	2.73	2.35	2.87
77	5.77	4.41	----	----	----	----
78	3.42	2.94	3.01	1.72	2.24	2.32
79	5.25	4.76	3.22	3.58	4.25	4.99
80	----	3.50	3.52	2.41	2.93	3.72
81	3.10	3.38	2.55	2.11	3.14	2.99
82	(3.93)	2.66	2.37	----	----	3.43
83	2.15	3.41	3.65	2.73	2.60	3.10
84	3.78	5.16	3.50	3.00	3.55	3.98
85	4.33	3.78	----	2.42	2.11	3.80
86	4.04	4.64	3.67	2.98	4.31	3.31
87	3.04	3.90	----	----	----	3.86
88	4.27	4.41	----	----	----	----
99	2.44	4.52	4.90	3.96	2.48	2.65
100	2.55	4.52	5.40	3.77	2.56	2.83
101	2.17	3.53	2.15	----	3.14	3.63

TABLE AII.73

EOSINOPHIL COUNT: FLIGHT 1
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	107	203	158	----	59	292
2	258	152	----	----	----	121
3	161	358	0	164	73	445
4	355	210	372	196	154	285
5	120	112	298	----	----	200
6	405	144	56	0	124	164
7	550	390	525	83	261	211
8	185	0	0	172	0	0
9	0	82	128	428	594	580
10	98	169	75	115	248	370
11	270	164	130	411	101	176
12	405	0	0	0	306	237
13	167	73	0	----	----	----
14	465	720	308	580	1144	910
15	675	137	268	106	396	----
16	155	0	52	----	----	----
17	242	(183)	256	0	72	400
18	370	384	278	0	201	581
19	310	100	518	585	240	538
20	350	213	258	----	----	----
21	114	120	196	544	752	331
22	170	121	218	81	224	244
90	132	152	102	64	136	0
91	193	358	180	698	252	296
92	484	665	314	225	220	1017

TABLE AII.74

EOSINOPHIL COUNT: FLIGHT 2
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0	0	66	64	148	210
24	72	109	38	0	396	----
25	108	308	72	70	212	282
26	215	0	122	88	0	48
27	108	90	84	157	378	93
28	204	60	180	184	156	387
29	112	94	100	95	0	598
30	(198)	322	714	718	803	1261
31	192	268	472	0	282	681
32	120	94	98	0	72	100
33	249	429	136	1200	855	662

TABLE AII.74 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
34	480	390	312	648	274	708
35	388	256	236	184	504	488
36	182	118	429	0	386	362
37	276	228	278	69	576	76
38	271	110	172	376	763	192
39	0	244	246	65	----	----
40	193	(201)	----	342	384	425
41	157	80	----	----	----	2320
42	390	231	422	243	147	130
43	288	585	495	592	708	950
44	146	0	424	414	492	900
93	1210	----	----	----	----	----
94	0	0	512	274	134	295
95	447	144	520	447	580	139
102	----	----	----	256	252	82

TABLE AII.75

EOSINOPHIL COUNT: FLIGHT 3
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	2470	840	704	999	1224	926
46	0	107	511	122	206	400
47	292	276	81	360	204	296
48	105	238	140	0	231	91
49	78	187	104	137	154	73
50	91	0	285	0	52	155
51	0	226	60	102	85	134
52	236	62	492	670	455	761
53	225	320	54	180	378	123
54	928	2010	328	1926	1216	1980
55	0	414	298	207	258	178
56	840	195	378	0	612	90
57	0	238	82	78	155	352
58	420	308	----	74	61	0
59	(393)	(314)	282	188	445	262
60	651	82	69	59	249	156
61	378	89	117	90	171	284
62	597	0	160	142	0	218
63	268	372	318	197	428	707
64	274	108	238	126	295	240
65	315	160	134	122	188	236
66	75	356	174	218	890	297
96	234	88	0	44	164	0
97	0	69	150	95	139	70
98	530	496	390	536	312	480

TABLE AII.76

EOSINOPHIL COUNT: FLIGHT 4
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0	94	62	0	0	0
68	226	390	486	702	592	---
69	0	101	153	126	147	124
70	100	0	492	216	286	796
71	358	274	129	46	429	408
72	562	100	280	388	970	1235
73	105	175	0	162	---	---
74	0	155	0	128	154	184
75	93	246	146	246	169	268
76	300	84	0	0	69	0
77	498	98	---	---	---	---
78	152	336	68	0	264	122
79	404	92	157	448	531	0
80	---	462	79	106	135	472
81	0	62	212	0	112	61
82	(205)	518	1024	---	---	2376
83	159	142	189	206	124	244
84	388	0	73	231	82	442
85	0	88	---	152	68	0
86	0	103	72	0	0	90
87	179	225	---	---	---	214
88	766	464	---	---	---	---
99	48	116	70	118	110	200
100	3732	1720	2295	2860	2556	3597
101	1872	1960	1130	---	1881	1027

TABLE AII.77

MONOCYTE COUNT: FLIGHT 1
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	642	710	79	---	118	146
2	258	304	---	---	---	242
3	644	179	129	328	73	89
4	711	210	0	98	77	285
5	1080	112	298	---	---	300
6	0	72	168	65	62	327
7	550	0	525	249	174	316
8	370	255	77	86	90	192
9	68	984	192	171	0	232
10	294	0	75	345	165	444
11	405	0	130	411	101	176
12	270	172	1575	390	153	1066
13	250	438	81	---	---	---
14	332	0	308	0	72	195
15	386	137	0	106	0	---

TABLE AII.77 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
16	388	69	104	---	---	---
17	80	(361)	171	264	145	480
18	185	384	185	314	302	581
19	310	500	0	234	480	269
20	612	355	172	---	---	---
21	227	2400	196	408	108	110
22	255	302	290	162	74	408
90	132	50	306	64	273	178
91	96	72	180	155	504	0
92	242	95	209	225	110	904

TABLE AII.78

MONOCYTE COUNT: FLIGHT 2
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	158	262	266	0	222	910
24	290	54	225	128	132	---
25	162	512	0	280	159	226
26	860	278	122	525	300	97
27	322	90	507	236	76	186
28	476	119	180	184	104	322
29	892	282	100	475	262	717
30	(452)	161	204	410	365	388
31	384	90	590	404	282	114
32	0	0	196	695	288	498
33	332	214	136	500	95	284
34	400	546	104	278	137	177
35	388	171	236	644	336	390
36	637	354	572	670	128	362
37	276	304	208	69	216	302
38	542	440	1376	753	545	960
39	252	326	62	195	---	---
40	772	(227)	----	114	288	340
41	1099	0	----	---	---	232
42	390	385	422	162	49	65
43	576	130	0	338	354	0
44	292	62	424	310	164	360
93	660	---	----	---	---	---
94	197	0	768	822	1076	148
95	372	0	260	224	194	208
102	---	---	----	763	84	165

TABLE AII.79

MONOCYTE COUNT: FLIGHT 3
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	247	280	448	222	102	54
46	460	221	657	305	274	320
47	585	92	486	300	136	148
48	840	238	280	405	308	273
49	236	374	468	206	231	435
50	273	73	228	74	104	542
51	126	226	600	459	340	201
52	236	310	492	67	91	338
53	450	320	324	300	378	184
54	116	268	328	428	0	396
55	0	0	696	518	258	178
56	240	1072	453	465	544	543
57	96	159	492	136	232	176
58	350	308	---	372	366	445
59	(223)	(258)	339	188	89	350
60	93	82	276	59	0	78
61	151	1780	292	45	114	426
62	100	175	160	568	220	0
63	0	496	530	197	1177	202
64	92	108	238	210	590	80
65	0	400	267	0	188	236
66	0	445	783	218	445	0
96	156	352	400	132	109	0
97	195	69	225	285	208	210
98	159	124	390	268	78	160

TABLE AII.80

MONOCYTE COUNT: FLIGHT 4
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	600	658	123	0	74	584
68	378	624	202	156	182	---
69	633	202	230	63	147	124
70	402	654	328	288	143	298
71	429	0	129	230	572	82
72	225	502	280	582	388	494
73	420	0	1440	162	---	---
74	302	0	118	64	693	92
75	279	123	48	123	169	179
76	0	584	89	262	138	151
77	298	588	---	---	---	---
78	152	420	274	168	66	183
79	404	183	314	320	266	0

TABLE AII.80 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
80	---	0	118	71	90	236
81	198	312	128	195	168	0
82	(333)	444	64	---	---	88
83	874	71	126	103	186	0
84	291	360	365	77	412	221
85	114	352	---	202	136	146
86	269	0	288	153	98	90
87	268	300	---	---	---	429
88	219	116	---	---	---	---
99	0	0	140	531	165	200
100	533	752	405	390	106	109
101	197	588	339	---	0	316

TABLE AII.81

BASOPHIL COUNT: FLIGHT 1
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0	0	0	---	0	0
2	0	76	---	---	---	60
3	0	179	64	0	0	0
4	0	0	0	0	0	0
5	0	0	0	---	---	0
6	0	0	56	0	0	0
7	110	0	75	0	0	0
8	0	0	0	0	0	0
9	68	328	64	0	0	58
10	0	0	0	115	0	74
11	135	0	0	0	0	88
12	0	0	175	0	0	118
13	0	73	0	---	---	---
14	0	0	62	0	0	0
15	96	0	0	0	0	---
16	0	0	0	---	---	---
17	80	(49)	0	176	0	0
18	0	192	0	104	0	0
19	155	0	0	0	120	0
20	88	71	0	---	---	---
21	0	120	0	0	0	0
22	0	0	145	0	0	0
90	132	0	51	0	0	44
91	0	72	60	0	0	0
92	0	0	104	0	0	0

TABLE AII.82

BASOPHIL COUNT: FLIGHT 2
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0	0	66	64	0	210
24	0	54	38	0	0	---
25	108	0	144	0	0	56
26	0	0	0	0	0	0
27	0	0	0	0	0	0
28	0	0	0	0	0	129
29	0	0	0	0	0	0
30	(33)	0	0	205	219	0
31	96	0	0	0	0	0
32	240	0	0	0	72	0
33	83	0	136	0	0	94
34	0	78	0	0	0	0
35	0	0	78	0	0	0
36	91	0	0	0	0	120
37	0	76	0	0	0	0
38	0	0	344	126	0	0
39	0	82	0	0	---	---
40	0	(18)	---	228	96	0
41	78	80	---	---	---	464
42	0	0	0	0	0	0
43	0	0	0	0	0	95
44	0	0	106	0	0	0
93	0	---	---	---	---	---
94	394	0	0	0	0	0
95	0	0	65	0	0	0
102	---	---	---	0	0	0

TABLE AII.83

BASOPHIL COUNT: FLIGHT 3
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0	140	64	0	0	0
46	0	0	146	0	0	0
47	0	0	0	0	0	0
48	0	0	70	0	0	0
49	0	0	0	0	77	0
50	0	0	0	0	0	0
51	0	0	0	0	0	0
52	0	0	0	0	0	84
53	0	0	0	0	0	0
54	0	134	0	107	0	0
55	134	0	0	0	0	0
56	0	195	0	0	0	0
57	0	0	0	0	0	0

TABLE AII.83 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
58	0	0	---	0	61	0
59	(10)	136	0	0	0	88
60	0	0	0	0	0	0
61	0	0	0	0	0	0
62	0	0	0	0	0	0
63	0	0	0	0	0	0
64	0	108	0	0	0	80
65	0	80	0	0	0	0
66	75	89	0	0	0	0
96	0	0	0	0	0	0
97	0	0	0	0	0	0
98	0	0	0	0	0	0

TABLE AII.84

BASOPHIL COUNT: FLIGHT 4
(cells/mm^3)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0	0	0	0	0	0
68	0	0	0	39	46	---
69	0	0	0	0	0	0
70	0	0	82	0	214	100
71	0	0	0	46	0	0
72	0	201	70	97	0	0
73	105	0	0	0	---	---
74	0	0	0	0	0	0
75	0	0	0	0	84	0
76	0	0	0	0	0	0
77	0	0	---	---	---	---
78	0	0	0	0	0	0
79	0	0	0	0	0	0
80	---	0	0	0	0	59
81	0	0	0	0	0	0
82	(5)	0	64	---	---	0
83	0	0	0	0	62	0
84	0	0	0	0	0	0
85	0	0	---	0	0	0
86	0	0	0	0	98	0
87	0	0	---	---	---	0
88	0	0	---	---	---	---
99	0	0	0	0	0	0
100	178	0	0	0	0	0
101	0	98	113	---	0	79

TABLE AII.85

MEAN DAILY URINARY VOLUME: FLIGHT 1
(ml/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	856	710	464	792	997	1060
2	988	780	796	----	----	1355
3	1553	1017	1157	1016	1753	1249
4	1295	998	718	948	1193	1513
5	1272	1086	1946	----	----	1419
6	1405	1027	813	970	993	1685
7	2405	1624	1577	1326	2528	2417
8	1544	1172	1195	1076	1408	1346
9	1680	1104	1108	1352	1137	1464
10	1487	1004	1221	1449	935	1504
11	2153	1790	2057	1718	1442	2427
12	1879	1545	2305	2790	1482	2126
13	1371	1051	459	----	----	----
14	1630	1231	1395	1952	1268	1976
15	2185	1356	990	1618	1643	1775
16	1752	1555	1463	3848	----	----
17	1397	1653	724	796	840	1168
18	1470	1317	950	983	1128	1688
19	1414	1221	791	1030	1055	1281
20	1520	1415	1482	----	----	----
21	1742	1523	1630	2734	1580	1808
22	2027	1316	1279	1914	1297	1522
90	1349	1068	1073	1296	1087	1194
91	1282	957	1185	1745	1050	1248
92	1326	1367	1441	1424	1463	1404

TABLE AII.86

MEAN DAILY URINARY VOLUME: FLIGHT 2
(ml/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	1263	853	399	478	717	1189
24	1138	972	634	1128	1007	770
25	1418	1147	858	1309	1375	1602
26	1515	1348	641	1212	1598	1942
27	1644	1237	394	660	800	1658
28	1422	1154	421	571	1332	1682
29	1292	1021	371	353	898	1501
30	(1410)	762	324	358	765	1106
31	1256	1158	983	1756	2435	2356
32	1261	1156	764	940	1207	1339
33	1340	1149	1004	1083	1865	2527
34	1220	783	950	1294	1212	1302
35	1069	862	491	709	902	1153

TABLE AII.86 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
36	1471	1307	414	1043	1245	1494
37	1363	1002	640	500	1150	1654
38	1295	1054	592	428	1253	1792
39	1084	1064	587	1205	3158	----
40	2512	2445	2280	2229	1997	2292
41	1249	994	1024	----	----	1253
42	1298	1122	848	929	1113	1487
43	1218	913	783	1241	1345	1343
44	2281	1965	864	848	2360	2747
93	943	----	----	----	----	----
94	1303	1366	1719	1579	1463	2280
95	1285	764	979	1164	1388	1258
102	----	----	----	1298	1167	1564

TABLE AII.87

MEAN DAILY URINARY VOLUME: FLIGHT 3
(ml/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	1609	1038	1415	948	1184	1647
46	1341	690	1027	1233	612	1482
47	1319	1280	1163	973	1170	1864
48	1501	1199	2095	1811	890	1619
49	1918	1455	2210	2049	1586	2342
50	1428	1050	1085	517	1047	1401
51	1334	883	1191	1000	1070	1201
52	1577	1302	1246	872	1303	1486
53	1323	849	1723	1148	918	1171
54	1266	1075	1878	1671	1279	1713
55	1714	1360	1726	1507	1474	1832
56	1675	1102	5061	4407	1178	1708
57	1331	979	1572	1770	902	1848
58	1525	1520	3114	1429	1478	1705
59	----	----	766	1216	1144	1468
60	1257	907	1592	1966	1264	1530
61	1432	1133	1315	1395	1091	1541
62	2124	1769	1856	1512	1376	3457
63	2375	2341	4132	3782	3283	4054
64	2440	2575	3349	3650	3415	3564
65	1867	1261	1238	924	1155	1541
66	2054	1405	1901	1493	1356	1974
96	1488	1222	1305	1640	1197	1489
97	847	803	975	1029	1185	1115
98	1892	2118	2582	2284	2962	3286

TABLE AII.88

MEAN DAILY URINARY VOLUME: FLIGHT 4
(ml/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	1801	1425	750	1498	968	2289
68	1603	1254	626	902	1461	3525
69	1949	1557	672	1710	1425	2287
70	1803	1332	751	640	1351	1763
71	1509	1272	411	1321	1417	1842
72	1421	975	563	981	1529	2019
73	1340	1042	586	1045	2937	----
74	1604	822	585	738	1445	1876
75	1526	1052	785	1146	1768	1831
76	1133	789	632	896	816	1319
77	850	840	599	----	----	----
78	1180	1011	1365	978	1121	1356
79	2863	2317	681	1255	2973	3051
80	1569	1170	680	1506	1380	1545
81	2146	1864	826	858	2580	2419
82	1297	620	554	----	----	1070
83	2123	1658	682	1160	2451	2046
84	1340	1170	609	678	1661	1809
85	1112	943	735	628	1052	1315
86	1451	1222	653	941	1743	1844
87	1629	1273	1159	----	----	1495
88	1304	1220	1426	----	----	----
99	1342	869	892	1130	906	782
100	1450	1337	1413	1460	1346	1814
101	1627	1784	2010	1983	2654	2231

TABLE AII.89

MEAN DAILY URINARY SODIUM: FLIGHT 1
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	154	164	43	10	306	196
2	188	169	82	---	---	111
3	238	210	63	82	263	197
4	269	246	64	33	321	345
5	230	187	44	---	---	181
6	298	257	29	5	216	313
7	320	320	53	22	350	321
8	237	232	29	5	320	305
9	316	230	68	43	263	246
10	213	210	90	24	159	307
11	313	283	137	82	243	350

TABLE AII.89 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
12	335	256	121	103	249	323
13	270	237	69	---	---	---
14	291	256	74	50	243	331
15	313	213	170	123	249	298
16	243	237	113	---	---	---
17	284	66	59	29	199	188
18	204	181	27	5	181	298
19	204	219	106	103	252	230
20	243	207	98	---	---	---
21	217	216	132	143	270	210
22	270	243	148	143	237	327
90	199	210	217	230	204	205
91	165	106	133	236	135	130
92	137	95	160	188	142	137

TABLE AII.90

MEAN DAILY URINARY SODIUM: FLIGHT 2
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	159	170	39	5	90	256
24	191	188	68	10	53	170
25	210	210	59	5	182	331
26	275	253	48	15	210	305
27	276	249	29	9	176	350
28	184	283	34	10	237	328
29	249	223	20	8	143	276
30	---	153	25	0	170	205
31	236	230	91	147	283	170
32	188	243	79	51	69	199
33	216	256	95	44	213	276
34	232	170	86	64	188	170
35	193	188	90	59	253	199
36	210	210	59	20	188	253
37	116	256	137	95	284	350
38	249	243	119	95	244	340
39	210	240	106	89	205	---
40	262	230	188	132	100	159
41	199	199	250	---	---	165
42	239	283	153	126	182	237
43	219	237	137	129	205	270
44	320	286	127	74	188	298
93	146	---	---	---	---	---
94	95	188	167	183	143	223
95	150	90	139	131	191	153
102	---	---	---	198	156	216

TABLE AII.91

MEAN DAILY URINARY SODIUM: FLIGHT 3
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	293	237	68	10	165	270
46	350	69	44	24	86	350
47	256	225	24	5	116	270
48	342	342	53	15	205	334
49	350	251	34	5	205	270
50	312	337	44	5	213	265
51	216	164	24	5	210	205
52	276	283	20	10	308	307
53	210	180	34	64	213	237
54	259	262	95	25	210	313
55	229	153	121	74	276	350
56	323	270	121	111	216	350
57	262	210	53	74	181	276
58	330	79	153	170	193	205
59	---	---	132	177	233	223
60	170	132	140	106	193	204
61	153	262	121	89	202	265
62	306	262	111	92	181	230
63	256	256	64	137	243	305
64	273	237	64	137	199	345
65	386	278	137	121	219	375
66	346	262	145	164	230	334
96	237	205	199	284	210	276
97	100	59	82	116	100	129
98	176	176	193	153	181	188

TABLE AII.92

MEAN DAILY URINARY SODIUM: FLIGHT 4
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	249	230	69	25	41	350
68	320	270	69	13	256	363
69	305	257	27	20	170	392
70	313	247	80	5	243	263
71	237	251	37	24	170	381
72	269	223	21	15	256	335
73	276	249	32	10	265	---
74	290	39	795	5	181	298
75	298	207	42	44	205	349
76	243	198	179	34	182	284
77	143	182	179	---	---	---

TABLE AII.92 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
78	285	263	108	59	193	298
79	237	210	84	104	199	291
80	262	226	108	92	191	283
81	265	243	80	137	210	243
82	256	132	143	---	---	193
83	276	272	74	98	216	350
84	263	291	52	59	210	352
85	230	243	58	66	204	283
86	302	249	55	78	263	230
87	343	329	135	---	---	350
88	283	276	126	---	---	---
99	148	153	185	206	159	127
100	176	143	154	149	181	223
101	153	240	270	200	276	335

TABLE AII.93

MEAN DAILY URINARY POTASSIUM: FLIGHT 1
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	58	50	30	15	39	50
2	76	60	42	--	--	69
3	91	50	35	29	60	50
4	81	71	29	15	71	66
5	81	60	30	--	--	123
6	101	66	30	20	25	64
7	91	67	35	15	35	50
8	81	60	25	10	41	50
9	112	66	71	34	66	41
10	41	35	41	29	71	46
11	112	71	76	49	71	66
12	106	71	76	59	76	76
13	71	66	23	--	--	--
14	69	60	20	15	60	55
15	91	55	25	5	25	63
16	76	41	15	--	--	--
17	112	63	46	29	50	41
18	60	46	20	14	43	66
19	71	60	46	34	50	46
20	76	50	30	--	--	--
21	85	66	50	49	66	48
22	91	85	66	49	55	76
90	76	85	88	94	80	60
91	80	90	88	135	96	81
92	80	101	88	119	76	85

TABLE AII.94

MEAN DAILY URINARY POTASSIUM: FLIGHT 2
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	66	71	20	15	41	88
24	55	66	41	35	25	35
25	91	81	45	35	50	101
26	85	65	25	40	55	66
27	91	71	25	15	36	96
28	50	81	30	25	50	85
29	104	85	30	20	35	101
30	--	53	15	5	25	81
31	76	71	41	55	144	137
32	60	55	45	35	33	76
33	60	60	71	45	50	66
34	66	46	51	40	55	60
35	69	55	30	20	65	85
36	66	76	30	10	25	96
37	25	55	28	5	35	71
38	73	55	35	10	30	83
39	55	50	41	20	46	--
40	112	81	66	50	71	139
41	76	66	73	--	--	144
42	75	76	76	45	55	76
43	71	57	58	35	46	85
44	96	81	66	25	46	106
93	55	--	--	--	--	--
94	85	112	135	176	99	144
95	71	60	80	50	51	55
102	--	--	--	91	76	91

TABLE AII.95

MEAN DAILY URINARY POTASSIUM: FLIGHT 3
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	80	60	33	30	46	55
46	96	41	20	35	17	66
47	71	71	10	30	25	71
48	107	81	20	35	35	81
49	104	76	30	20	41	55
50	91	81	20	10	25	55
51	76	71	10	10	30	48
52	60	72	18	5	34	53
53	55	36	15	30	46	66
54	66	60	46	50	41	46

TABLE AII.95 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
55	60	35	60	41	85	79
56	91	76	60	71	85	81
57	55	46	9	15	41	55
58	85	45	41	60	76	81
59	--	--	28	50	41	41
60	71	66	30	30	43	71
61	41	66	46	50	71	50
62	109	76	41	50	60	76
63	91	76	15	76	66	55
64	60	81	30	74	60	85
65	87	55	55	81	54	76
66	106	66	46	85	76	81
96	72	85	66	115	55	83
97	66	91	76	96	76	56
98	71	101	91	91	43	81

TABLE AII.96

MEAN DAILY URINARY POTASSIUM: FLIGHT 4
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	62	71	41	55	15	55
68	80	71	30	30	76	66
69	76	76	17	55	50	76
70	85	81	38	30	66	69
71	66	85	27	25	41	76
72	76	66	17	20	50	57
73	80	66	11	10	35	--
74	71	25	41	15	25	60
75	96	60	22	60	48	71
76	60	63	67	60	55	35
77	41	50	58	--	--	--
78	83	71	49	80	50	60
79	60	58	26	35	55	60
80	66	69	27	30	47	66
81	71	66	26	25	35	50
82	70	42	27	--	--	106
83	55	66	22	60	50	55
84	71	71	22	40	43	71
85	55	71	33	60	45	57
86	84	63	18	49	66	50
87	85	66	46	--	--	106
88	71	70	62	--	--	--
99	53	91	87	123	69	46
100	96	91	115	162	71	96
101	61	131	132	145	81	76

TABLE AII.97

MEAN DAILY URINARY CALCIUM: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.21	0.22	0.16	0.10	0.27	0.31
2	0.09	0.13	0.13	----	----	0.17
3	0.26	0.20	0.13	0.10	0.20	0.21
4	0.21	0.20	0.12	0.10	0.28	0.39
5	0.15	0.12	0.09	----	----	0.19
6	0.22	0.16	0.05	0.02	0.15	0.32
7	0.35	0.32	0.10	0.08	0.31	0.36
8	0.22	0.20	0.09	0.07	0.36	0.34
9	0.30	0.22	0.17	0.14	0.34	0.35
10	0.15	0.13	0.13	0.12	0.18	0.32
11	0.29	0.27	0.33	0.20	0.37	0.50
12	0.15	0.13	0.11	0.14	0.24	0.25
13	0.13	0.17	0.13	----	----	----
14	0.08	0.07	0.06	0.02	0.06	0.13
15	0.27	0.16	0.19	0.19	0.36	0.43
16	0.07	0.05	0.04	----	----	----
17	0.30	0.18	0.16	0.13	0.27	0.26
18	0.24	0.23	0.09	0.08	0.19	0.40
19	0.16	0.15	0.08	0.09	0.19	0.20
20	0.11	0.08	0.06	----	----	----
21	0.18	0.10	0.03	0.09	0.24	0.14
22	0.31	0.27	0.19	0.19	0.27	0.36
90	0.13	0.16	0.11	0.16	0.15	0.13
91	0.27	0.28	0.25	0.31	0.26	0.25
92	0.34	0.31	0.20	0.26	0.27	0.25

TABLE AII.98

MEAN DAILY URINARY CALCIUM: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.20	0.22	0.12	0.14	0.18	0.35
24	0.23	0.03	0.03	0.04	0.03	0.12
25	0.15	0.12	0.09	0.13	0.17	0.31
26	0.28	0.21	0.17	0.16	0.26	0.32
27	0.11	0.09	0.03	0.02	0.09	0.17
28	0.20	0.26	0.07	0.08	0.25	0.27
29	0.19	0.17	0.04	0.06	0.22	0.38
30	----	0.19	0.07	0.07	0.27	0.26
31	0.21	0.25	0.16	0.19	0.29	0.29
32	0.25	0.25	0.11	0.18	0.16	0.36
33	0.06	0.05	0.08	0.10	0.22	0.11
34	0.16	0.10	0.11	0.16	0.25	0.15

TABLE AII.98 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	0.17	0.13	0.08	0.11	0.26	0.25
36	0.25	0.23	0.14	0.18	0.16	0.31
37	0.03	0.06	0.03	0.04	0.17	0.06
38	0.21	0.18	0.04	0.09	0.23	0.35
39	0.14	0.10	0.05	0.08	0.09	----
40	0.24	0.17	0.29	0.17	0.24	0.23
41	0.08	0.06	0.13	----	----	0.12
42	0.18	0.16	0.06	0.07	0.15	0.19
43	0.10	0.11	0.07	0.11	0.18	0.18
44	0.15	0.15	0.06	0.09	0.16	0.17
93	0.26	----	----	----	----	----
94	0.14	0.23	0.19	0.24	0.21	0.19
95	0.05	0.04	0.06	0.03	0.05	0.04
102	----	----	----	0.40	0.43	0.31

TABLE AII.99

MEAN DAILY URINARY CALCIUM: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.22	0.17	0.15	0.20	0.26	0.33
46	0.23	0.08	0.10	0.08	0.12	0.36
47	0.35	0.28	0.17	0.22	0.39	0.34
48	0.26	0.25	0.10	0.17	0.30	0.42
49	0.32	0.24	0.08	0.07	0.18	0.31
50	0.42	0.34	0.10	0.05	0.29	0.40
51	0.25	0.26	0.10	0.11	0.34	0.26
52	0.26	0.30	0.12	0.13	0.32	0.38
53	0.16	0.16	0.09	0.14	0.20	0.19
54	0.34	0.32	0.27	0.25	0.31	0.39
55	0.12	0.08	0.11	0.09	0.28	0.26
56	0.20	0.19	0.12	0.13	0.22	0.27
57	0.19	0.20	0.06	0.12	0.22	0.24
58	0.34	0.17	0.17	0.36	0.21	0.23
59	----	----	0.27	0.20	0.28	0.29
60	0.20	0.17	0.12	0.16	0.34	0.23
61	0.11	0.13	0.09	0.07	0.13	0.22
62	0.40	0.40	0.18	0.11	0.25	0.52
63	0.09	0.10	0.05	0.13	0.16	0.15
64	0.24	0.22	0.06	0.09	0.21	0.26
65	0.29	0.20	0.07	0.10	0.20	0.30
66	0.34	0.26	0.09	0.10	0.26	0.34
96	0.08	0.10	0.10	0.11	0.11	0.17
97	0.27	0.24	0.21	0.29	0.21	0.29
98	0.25	0.28	0.26	0.23	0.23	0.26

TABLE AII.100

MEAN DAILY URINARY CALCIUM: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.30	0.22	0.11	0.26	0.36	0.43
68	0.17	0.17	0.12	0.14	0.25	0.33
69	0.34	0.32	0.09	0.16	0.24	0.38
70	0.20	0.16	0.16	0.12	0.21	0.26
71	0.09	0.09	0.03	0.03	0.09	0.13
72	0.28	0.23	0.08	0.14	0.27	0.35
73	0.21	0.21	0.07	0.10	0.25	----
74	0.30	0.17	0.16	0.11	0.36	0.32
75	0.25	0.18	0.07	0.11	0.27	0.35
76	0.19	0.17	0.10	0.12	0.20	0.23
77	0.17	0.17	0.12	----	----	----
78	0.22	0.19	0.11	0.19	0.31	0.28
79	0.16	0.12	0.05	0.10	0.21	0.17
80	0.08	0.08	0.06	0.09	0.10	0.09
81	0.13	0.06	0.08	0.13	0.25	0.15
82	0.15	0.17	0.08	----	----	0.21
83	0.18	0.22	0.07	0.10	0.28	0.32
84	0.22	0.20	0.07	0.09	0.18	0.30
85	0.21	0.24	0.05	0.11	0.27	0.29
86	0.30	0.26	0.06	0.19	0.34	0.26
87	0.14	0.13	0.04	----	----	0.18
88	0.16	0.17	0.11	----	----	----
99	0.13	0.20	0.14	0.14	0.17	0.11
100	0.35	0.36	0.34	0.28	0.38	0.46
101	0.17	0.23	0.31	0.18	0.35	0.51

TABLE AII.101

MEAN DAILY URINARY PHOSPHORUS: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.91	0.93	0.69	0.52	0.76	0.84
2	0.99	0.90	0.75	----	----	0.91
3	1.19	0.84	0.63	0.44	0.90	0.87
4	1.18	1.10	0.64	0.45	1.12	1.23
5	1.16	0.85	0.43	----	----	1.22
6	0.98	0.86	0.62	0.56	0.71	0.67
7	1.40	1.16	0.55	0.56	0.97	1.13
8	1.25	1.00	0.40	0.43	1.02	1.13
9	1.57	1.12	1.40	0.96	1.05	1.15
10	0.76	0.69	0.96	0.87	0.96	0.85
11	1.60	1.18	1.85	1.34	1.12	1.57
12	1.47	1.04	1.64	1.22	1.20	1.47

TABLE AII.101 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	1.48	1.02	0.68	----	----	----
14	0.97	0.82	0.64	0.51	0.68	0.80
15	1.07	0.83	0.69	0.48	0.66	1.08
16	0.90	0.80	0.42	----	----	----
17	1.55	1.01	0.89	0.71	0.82	0.96
18	0.97	0.87	0.45	0.54	1.05	0.98
19	1.00	0.89	0.66	0.74	0.94	1.05
20	0.92	0.75	0.48	----	----	----
21	1.01	1.02	0.76	0.52	0.94	1.02
22	1.30	1.18	0.91	0.91	0.92	1.17
90	0.53	0.83	0.90	0.83	0.85	0.99
91	1.22	1.34	1.38	1.81	1.20	1.17
92	0.97	1.08	0.86	1.03	0.82	0.97

TABLE AII.102

MEAN DAILY URINARY PHOSPHORUS: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.97	0.99	0.68	0.69	0.62	0.76
24	0.65	0.81	0.96	0.84	0.32	0.15
25	1.23	0.95	1.05	1.10	0.70	0.88
26	1.41	1.13	0.92	0.99	0.90	0.73
27	1.18	0.95	0.59	0.61	0.47	0.87
28	1.05	1.19	0.59	0.54	1.01	1.04
29	1.37	1.21	0.60	0.69	0.64	0.94
30	----	0.83	0.41	0.32	0.55	0.86
31	1.23	1.05	0.97	0.92	1.62	1.16
32	0.94	1.03	1.00	1.03	0.45	0.90
33	1.06	1.00	1.37	1.51	0.95	0.77
34	1.00	0.80	1.15	1.07	0.75	0.59
35	0.92	0.97	0.70	0.59	0.93	0.78
36	0.95	1.03	0.64	0.32	0.59	0.86
37	0.46	1.02	0.52	0.38	0.82	1.19
38	1.10	1.02	0.59	0.60	0.67	1.11
39	0.96	0.81	0.66	0.54	0.97	----
40	1.44	1.13	1.03	0.75	0.86	1.13
41	1.01	0.96	0.87	----	----	0.90
42	1.06	1.26	0.94	0.77	0.70	0.95
43	0.94	0.91	0.83	0.70	0.69	0.96
44	1.27	0.85	1.01	0.48	0.77	1.02
93	0.97	----	----	----	----	----
94	0.85	1.39	1.38	1.59	1.40	1.91
95	0.76	0.86	0.70	0.56	0.77	0.84
102	----	----	----	1.11	0.99	1.32

TABLE AII.103

MEAN DAILY URINARY PHOSPHORUS: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	1.27	1.02	1.06	0.95	0.81	0.93
46	1.12	0.76	0.56	0.86	0.36	0.64
47	1.25	1.05	0.35	0.76	0.45	1.06
48	1.58	1.34	0.51	0.76	0.70	1.45
49	1.64	1.24	0.40	0.45	1.01	1.27
50	1.44	1.26	0.53	0.36	0.80	1.06
51	1.31	1.26	0.25	0.29	0.87	0.93
52	0.93	1.00	0.39	0.20	0.75	0.92
53	0.96	0.68	0.46	0.71	0.60	0.81
54	1.24	1.18	1.19	0.91	0.70	0.96
55	1.10	0.71	1.40	0.92	1.26	1.39
56	1.32	1.17	1.43	1.47	1.22	1.23
57	1.06	0.92	0.34	0.51	0.67	0.95
58	1.40	0.86	1.13	1.02	0.73	0.92
59	----	----	0.88	0.48	0.76	0.99
60	1.08	0.97	0.56	0.38	0.88	1.01
61	0.62	0.99	0.43	0.58	0.90	1.08
62	1.70	1.19	0.70	0.57	0.99	1.48
63	1.39	1.05	0.33	0.81	1.20	1.59
64	1.34	1.16	0.43	0.64	0.90	1.40
65	1.34	1.22	1.02	0.92	1.17	1.30
66	1.48	1.23	1.10	0.80	1.16	1.21
96	0.86	1.27	1.03	1.14	0.79	1.45
97	0.94	1.24	1.03	1.10	1.02	1.02
98	1.09	1.43	1.18	1.05	1.06	1.53

TABLE AII.104

MEAN DAILY URINARY PHOSPHORUS: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	1.24	1.02	0.80	0.84	0.64	0.97
68	1.24	1.12	0.75	0.51	1.03	1.02
69	1.36	1.19	0.46	0.89	0.71	1.22
70	1.29	1.16	0.90	0.59	0.92	1.10
71	1.19	1.16	0.53	0.47	0.76	1.24
72	1.18	1.03	0.35	0.45	0.99	1.27
73	1.20	1.18	0.31	0.15	0.62	----
74	1.45	0.93	0.76	0.22	0.70	1.40
75	1.43	1.01	0.50	0.97	0.90	1.26
76	1.02	0.94	1.01	1.05	0.72	0.83
77	0.62	0.80	0.79	----	----	----
78	1.35	1.20	0.93	1.47	1.06	1.25

TABLE AII.104 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	1.10	0.98	0.56	0.58	0.81	0.92
80	1.12	0.99	0.62	0.57	0.70	0.95
81	1.10	0.98	0.39	0.49	0.86	1.02
82	0.99	0.75	0.53	----	----	1.20
83	1.04	1.05	0.43	0.63	0.87	1.27
84	1.08	1.13	0.38	0.54	0.82	1.17
85	1.10	1.04	0.47	0.71	0.73	1.02
86	1.27	1.20	0.40	0.64	1.11	1.34
87	1.13	1.16	0.86	----	----	1.05
88	1.15	1.10	1.37	----	----	----
99	0.74	1.09	0.83	0.90	0.86	0.76
100	1.40	1.34	1.08	1.07	1.15	1.20
101	1.00	1.45	1.29	0.93	1.48	2.52

TABLE AII.105

MEAN DAILY URINARY CHLORIDE: FLIGHT 1
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	168	149	39	2	288	214
2	278	127	64	---	---	140
3	276	212	52	61	260	203
4	294	241	39	21	306	347
5	258	188	36	---	---	204
6	323	253	23	0	152	328
7	340	308	37	0	343	338
8	267	223	21	0	296	315
9	337	217	43	9	257	242
10	246	214	62	16	159	310
11	342	264	89	50	265	341
12	308	244	83	62	243	308
13	209	221	55	---	---	---
14	247	260	76	17	239	347
15	338	217	132	83	229	305
16	270	253	94	---	---	---
17	320	57	52	14	204	163
18	227	193	25	3	180	279
19	227	215	92	79	254	222
20	279	222	79	---	---	---
21	248	214	106	107	271	205
22	309	237	134	120	234	331
90	208	217	208	210	230	188
91	170	122	135	206	169	126
92	138	99	161	116	160	146

TABLE AII.106

MEAN DAILY URINARY CHLORIDE: FLIGHT 2
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	167	169	34	0	73	258
24	202	196	70	0	43	143
25	235	218	56	0	176	346
26	287	251	42	0	198	292
27	303	254	29	0	150	358
28	186	287	31	0	208	337
29	271	224	25	0	112	285
30	---	155	34	0	172	205
31	238	228	64	121	315	217
32	189	233	60	15	76	214
33	220	250	77	22	242	287
34	253	167	69	38	214	170
35	210	171	77	29	245	207
36	228	212	59	12	169	256
37	109	245	129	66	206	330
38	269	245	112	61	248	372
39	224	226	98	63	201	---
40	272	236	204	90	161	174
41	213	193	215	---	---	191
42	264	294	142	98	200	243
43	213	221	125	106	218	256
44	299	283	78	51	183	287
93	155	---	---	---	---	---
94	109	200	206	186	161	241
95	155	86	156	106	201	143
102	---	---	---	189	164	231

TABLE AII.107

MEAN DAILY URINARY CHLORIDE: FLIGHT 3
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	283	234	33	0	156	252
46	364	56	25	8	71	372
47	251	229	18	1	98	251
48	318	331	41	10	187	295
49	366	258	31	0	170	320
50	308	286	35	0	173	256
51	195	162	13	4	176	212
52	254	275	15	10	276	322
53	202	181	21	29	210	233
54	253	263	61	3	168	293
55	214	149	96	45	284	358

TABLE AII.107 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
56	314	274	106	62	227	350
57	253	218	35	42	177	270
58	320	68	141	168	224	234
59	---	---	115	91	240	231
60	166	151	119	91	214	204
61	148	286	112	60	200	263
62	298	301	95	64	203	228
63	243	240	56	116	241	256
64	218	289	60	108	207	333
65	387	305	117	139	206	392
66	353	294	114	146	244	342
96	244	220	254	293	259	300
97	111	62	84	90	100	104
98	170	186	181	137	166	163

TABLE AII.108

MEAN DAILY URINARY CHLORIDE: FLIGHT 4
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	230	245	49	9	75	343
68	316	286	108	0	248	370
69	294	263	33	0	129	402
70	329	264	113	0	237	309
71	205	273	49	1	128	350
72	268	240	32	0	218	341
73	287	256	42	0	266	---
74	272	30	81	1	169	241
75	284	219	38	16	186	369
76	238	200	167	15	182	277
77	150	196	166	---	---	---
78	259	261	109	37	206	276
79	227	223	82	72	193	263
80	258	237	107	60	190	271
81	226	244	59	105	248	216
82	256	176	145	---	---	207
83	252	287	70	49	218	355
84	252	296	62	55	209	370
85	223	249	62	62	214	267
86	303	275	65	76	256	219
87	329	333	141	---	---	346
88	267	289	146	---	---	---
99	136	171	201	210	155	109
100	173	152	196	163	186	228
101	141	257	352	213	385	347

TABLE AII.109

MEAN DAILY URINARY NITROGEN: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	12.0	10.1	10.0	7.5	10.4	11.7
2	13.5	12.2	10.9	----	----	10.9
3	14.8	11.3	9.5	9.6	15.5	11.5
4	15.5	16.7	10.3	9.4	14.7	16.7
5	16.3	15.1	6.1	----	----	15.0
6	16.8	14.8	7.5	5.4	12.0	16.5
7	18.1	16.9	7.7	4.3	14.8	17.3
8	16.2	13.7	6.8	4.6	11.3	15.1
9	16.5	12.9	21.3	16.9	15.3	17.1
10	12.0	11.8	14.6	14.4	13.9	12.3
11	17.4	17.9	26.5	23.9	14.4	23.5
12	9.9	17.4	24.1	24.5	16.7	21.4
13	19.3	16.2	7.7	----	----	----
14	17.2	14.9	10.2	5.9	13.3	20.9
15	16.3	12.6	10.2	5.4	10.2	17.5
16	14.6	12.5	6.0	----	----	----
17	15.1	16.7	10.9	11.1	12.1	14.6
18	15.5	10.0	7.0	6.7	11.6	16.0
19	15.1	14.8	10.0	11.1	12.7	14.7
20	14.6	14.1	7.1	----	----	----
21	15.9	15.3	12.9	13.5	12.5	15.1
22	17.3	16.9	13.2	15.0	14.6	17.7
90	10.2	16.9	16.1	15.8	17.1	17.2
91	15.7	14.1	17.0	19.6	12.3	16.3
92	14.6	12.7	14.6	14.3	10.3	12.4

TABLE AII.110

MEAN DAILY URINARY NITROGEN: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	12.7	13.4	7.6	10.5	8.4	10.4
24	11.0	9.8	10.1	14.2	11.3	9.6
25	14.8	15.4	12.7	14.0	13.7	15.7
26	16.9	14.2	11.3	11.4	14.2	14.5
27	17.3	16.5	6.4	6.6	9.7	17.4
28	10.8	17.7	8.0	5.9	13.1	16.7
29	19.7	18.3	8.1	6.4	15.1	15.9
30	---	12.6	5.4	2.9	7.4	10.1
31	16.2	15.6	14.1	15.2	20.3	13.9
32	11.6	15.8	16.5	16.6	4.4	11.4
33	14.6	16.0	23.6	25.9	12.7	13.0
34	15.7	13.3	18.9	25.7	11.9	7.5

TABLE AII.110 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	12.1	13.5	9.0	7.2	12.1	10.8
36	12.9	15.1	8.6	6.8	10.3	13.5
37	17.8	15.7	8.4	5.4	10.9	18.5
38	16.4	14.9	8.2	6.2	11.8	19.1
39	12.8	13.1	10.5	8.2	14.8	----
40	19.1	14.4	14.0	10.5	10.8	10.0
41	13.6	12.3	12.4	----	----	11.4
42	11.5	14.4	14.2	13.6	12.1	14.0
43	15.3	14.1	11.8	15.0	12.3	13.5
44	17.2	17.6	15.6	16.8	14.8	15.1
93	12.1	----	----	----	----	----
94	8.5	17.1	16.6	13.2	15.8	19.0
95	12.9	11.8	12.6	8.6	16.9	12.6
102	----	----	----	20.5	11.7	15.5

TABLE AII.111

MEAN DAILY URINARY NITROGEN: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	17.2	15.8	12.0	7.2	13.1	15.4
46	18.4	12.6	6.7	10.4	10.4	17.4
47	14.9	16.1	4.1	7.8	9.0	13.2
48	16.8	17.8	7.7	9.5	11.2	17.0
49	21.6	18.1	7.4	5.9	12.9	16.2
50	16.0	17.3	6.7	3.9	10.8	14.4
51	18.4	10.9	2.3	3.9	12.6	11.9
52	13.7	14.8	6.0	3.4	11.0	14.2
53	12.6	11.5	11.4	12.1	11.6	13.1
54	16.4	16.7	17.4	11.6	14.5	11.1
55	16.8	9.3	24.6	18.9	16.5	17.2
56	17.3	15.9	29.5	26.6	17.0	16.8
57	14.0	13.2	10.4	7.1	10.2	14.5
58	17.9	14.2	13.4	12.8	11.0	13.9
59	----	----	8.1	4.4	10.1	12.3
60	17.0	14.1	8.2	5.3	10.6	12.2
61	8.6	14.7	11.9	9.2	13.5	14.5
62	16.8	16.3	11.7	8.7	11.8	19.4
63	15.7	13.2	16.7	12.8	16.7	17.8
64	19.3	19.1	13.7	13.2	16.1	18.6
65	18.6	16.5	16.2	15.8	16.2	20.2
66	17.7	17.2	17.4	15.5	17.5	18.5
96	17.2	20.2	20.0	20.2	14.1	18.1
97	12.2	13.3	12.9	11.3	11.9	12.2
98	12.3	15.3	16.6	14.3	18.5	20.2

TABLE AII.112

MEAN DAILY URINARY NITROGEN: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	16.6	13.7	6.1	8.9	10.9	16.3
68	17.0	16.9	6.1	9.6	16.0	23.0
69	18.2	17.6	6.1	11.5	13.9	21.9
70	18.0	15.9	13.0	10.2	15.8	18.2
71	15.7	17.7	7.5	6.4	12.8	19.0
72	14.6	13.7	5.2	5.8	11.5	17.7
73	16.2	16.5	3.8	3.1	9.6	----
74	19.2	13.7	6.3	4.9	11.6	16.6
75	14.2	14.1	8.9	15.8	12.2	18.9
76	4.7	10.6	19.1	17.1	11.4	13.1
77	9.7	11.8	15.5	----	----	----
78	17.3	15.8	15.5	25.5	15.1	14.3
79	17.1	15.3	8.4	7.3	11.3	15.1
80	15.1	13.6	8.9	6.4	13.1	16.1
81	16.6	16.4	6.5	6.2	13.0	16.3
82	11.6	8.6	8.1	----	----	14.1
83	14.0	15.3	5.9	9.4	14.5	17.5
84	15.4	15.5	5.7	8.9	11.3	17.7
85	14.2	15.8	7.6	10.1	13.7	16.1
86	16.7	16.1	11.4	11.7	13.3	17.4
87	17.7	17.4	8.8	----	----	16.6
88	15.1	15.5	10.2	----	----	----
99	11.4	12.4	13.9	12.7	12.0	10.4
100	17.4	14.9	19.8	13.8	15.8	17.0
101	11.4	17.0	18.6	14.4	15.8	16.5

TABLE AII.113

RESTING MINUTE URINARY VOLUME: FLIGHT 1
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.80	0.66	0.34	----	0.86	1.12
2	1.01	0.50	----	----	----	1.48
3	1.73	1.41	0.38	1.00	0.76	2.65
4	0.46	0.80	0.28	0.76	2.02	2.14
5	1.93	3.16	0.16	----	----	2.88
6	2.52	1.64	0.45	0.41	4.10	4.18
7	3.05	3.45	1.21	0.46	2.74	3.40
8	0.98	1.16	0.27	0.21	3.61	1.23
9	2.03	1.04	0.46	0.80	2.11	1.52
10	1.82	0.92	0.63	1.12	2.66	0.75
11	3.55	4.36	1.09	1.04	5.46	2.90
12	2.28	2.09	1.36	1.66	4.06	3.93

TABLE AII.113 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	1.82	1.11	0.26	----	----	----
14	1.98	1.92	0.50	1.43	4.02	3.05
15	2.71	1.36	0.75	1.58	1.24	----
16	2.35	3.72	0.84	----	----	----
17	1.09	----	1.12	0.59	1.09	1.12
18	2.53	2.03	0.84	1.22	2.43	2.92
19	1.51	2.49	0.68	0.94	2.62	0.53
20	2.29	2.95	0.79	----	----	----
21	2.96	1.96	0.71	2.39	3.34	2.79
22	3.34	1.88	2.93	2.09	3.67	2.26
90	3.42	0.84	0.62	1.04	1.28	0.81
91	0.24	2.45	2.20	3.62	2.84	1.32
92	2.25	1.69	1.50	1.80	0.70	0.57

TABLE AII.114

RESTING MINUTE URINARY VOLUME: FLIGHT 2
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	1.54	0.58	0.38	0.34	2.64	1.98
24	1.08	0.59	0.41	0.90	----	----
25	0.84	0.49	0.50	0.48	2.36	2.92
26	1.02	1.52	0.38	0.57	2.36	2.64
27	0.63	0.39	0.25	0.45	1.13	1.24
28	3.13	1.23	0.31	0.26	2.68	2.67
29	1.03	0.57	0.22	0.18	2.26	1.28
30	----	0.46	0.18	0.22	1.83	1.01
31	0.76	0.94	0.85	1.32	2.77	2.43
32	0.98	1.86	0.32	0.75	1.87	2.50
33	1.64	0.58	0.57	0.56	2.48	1.89
34	1.63	0.54	0.52	0.75	1.18	1.20
35	0.82	0.58	0.31	0.53	3.19	1.32
36	1.27	1.02	0.34	1.94	3.01	1.12
37	0.92	0.61	0.59	0.33	2.28	1.37
38	0.41	0.66	0.44	0.29	3.55	2.49
39	0.42	0.53	0.42	----	----	----
40	1.78	----	----	1.79	1.20	0.18
41	0.86	0.53	----	----	----	1.80
42	1.45	0.81	0.56	0.61	1.40	3.39
43	0.50	0.56	0.54	0.90	0.63	0.74
44	1.37	0.74	0.49	0.89	4.21	2.70
93	0.96	----	----	----	----	----
94	1.75	3.03	5.54	2.78	4.04	3.41
95	1.52	2.41	0.62	3.17	2.82	3.48
102	----	----	----	1.97	2.22	3.31

TABLE AII.115

RESTING MINUTE URINARY VOLUME: FLIGHT 3
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	3.79	1.03	0.59	0.35	3.22	2.15
46	2.56	0.94	0.41	0.45	1.95	4.45
47	2.62	1.96	0.44	0.41	3.52	1.60
48	3.92	3.97	0.46	0.25	4.27	3.86
49	3.29	0.67	1.24	1.06	3.42	1.91
50	1.13	0.83	0.44	0.32	3.03	0.89
51	1.37	0.80	0.63	1.16	2.14	0.89
52	0.87	1.17	0.51	0.15	2.22	0.94
53	1.21	0.72	0.47	0.33	0.56	0.52
54	0.91	0.77	0.59	0.53	4.05	1.64
55	2.58	2.49	0.77	0.47	3.42	2.69
56	2.80	1.05	0.72	0.93	3.18	3.83
57	1.50	0.83	1.54	0.62	3.58	1.92
58	2.61	0.93	----	1.49	2.20	1.60
59	----	----	0.96	1.14	3.19	2.87
60	3.63	0.45	2.40	0.79	1.36	0.65
61	2.55	1.16	0.51	0.75	3.40	1.63
62	1.80	1.23	0.10	0.50	1.56	2.28
63	2.71	1.70	1.08	1.33	4.44	1.60
64	4.26	2.62	0.88	2.39	4.06	3.28
65	1.58	0.67	0.47	0.47	3.26	0.57
66	2.69	1.35	2.31	0.78	3.66	0.69
96	1.77	0.87	3.21	1.61	1.77	2.87
97	1.12	0.69	1.09	0.97	1.54	1.07
98	2.68	3.15	1.72	1.95	3.23	2.72

TABLE AII.116

RESTING MINUTE URINARY VOLUME: FLIGHT 4
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	1.80	1.25	0.53	0.39	3.47	2.66
68	0.91	0.59	0.38	0.29	3.29	----
69	1.70	0.46	0.40	1.20	3.25	0.91
70	1.07	0.80	0.40	0.27	2.13	2.36
71	0.82	0.68	0.31	0.98	2.94	1.35
72	1.07	0.52	0.29	0.25	3.15	1.20
73	2.93	0.53	0.65	0.79	----	----
74	2.41	0.83	0.80	0.54	1.82	1.17
75	0.52	0.48	0.61	0.74	0.71	0.98
76	0.57	0.65	0.77	0.42	2.33	0.62
77	0.40	0.42	----	----	----	----
78	0.71	0.54	0.54	0.54	1.33	0.82

TABLE AII.116 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	2.43	0.86	0.69	1.04	1.25	0.99
80	1.18	0.92	0.43	0.93	1.37	1.56
81	1.13	0.84	0.61	1.25	1.47	1.12
82	(1.26)	1.42	0.40	----	----	1.34
83	1.54	1.32	0.54	0.49	2.67	2.94
84	0.98	0.64	0.63	0.35	1.34	1.55
85	1.20	0.42	0.45	0.32	1.82	0.66
86	0.58	0.43	0.50	0.45	1.47	0.88
87	0.79	0.82	----	----	----	0.77
88	1.74	0.72	----	----	----	----
99	1.51	0.36	0.69	1.02	0.43	0.51
100	0.73	0.66	1.38	1.55	1.23	2.05
101	3.92	1.38	2.63	3.18	3.94	2.02

TABLE AII.117

RESTING URINARY OSMOLAR EXCRETION: FLIGHT 1
(μOsm/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	824	618	407	331	725	972
2	589	568	---	---	---	943
3	784	704	448	903	684	731
4	831	817	355	683	1350	1140
5	954	974	61	---	---	928
6	1131	1109	327	249	1361	1313
7	624	912	270	255	1009	1074
8	511	852	154	106	1167	805
9	1142	994	553	767	1519	1073
10	825	758	640	764	941	659
11	1029	1222	736	959	1234	1001
12	898	1097	866	1086	1673	1565
13	1167	965	313	---	---	---
14	927	870	356	393	1344	1110
15	1284	906	615	458	689	---
16	836	1234	606	---	---	---
17	1079	---	1129	544	1048	1083
18	750	933	379	348	489	1106
19	690	1132	684	739	1122	420
20	821	986	494	---	---	---
21	866	1093	586	788	1022	1234
22	1173	969	724	912	1109	981
90	852	763	645	926	811	810
91	158	1351	1083	1692	1514	870
92	680	606	577	727	496	462

TABLE AII.118

RESTING URINARY OSMOLAR EXCRETION: FLIGHT 2
(μOsm/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	1210	632	477	340	1833	1147
24	799	559	489	645	---	---
25	782	466	568	416	1396	1143
26	716	863	326	396	904	782
27	550	424	272	67	913	553
28	1136	913	341	200	1166	984
29	976	634	266	246	992	775
30	---	479	224	177	838	833
31	779	850	606	751	799	948
32	978	1319	252	688	1124	930
33	827	612	644	658	824	698
34	1006	519	573	854	935	736
35	765	364	364	366	1098	798
36	889	1014	422	198	1032	972
37	777	656	629	298	1032	916
38	407	652	502	322	924	1057
39	424	665	480	619	---	---
40	1415	---	---	627	560	119
41	813	540	---	---	---	888
42	835	776	563	629	885	1243
43	571	639	563	888	520	641
44	841	672	564	904	1145	947
93	781	---	---	---	---	---
94	1275	2790	875	1201	1033	872
95	626	644	508	972	775	760
102	---	---	---	881	783	1020

TABLE AII.119

RESTING URINARY OSMOLAR EXCRETION: FLIGHT 3
(μOsm/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	1261	992	501	276	1179	1377
46	391	933	332	326	1440	1870
47	1067	991	411	286	1104	1004
48	1184	1506	441	216	1513	1619
49	947	589	246	167	1065	947
50	349	866	162	125	1041	786
51	1204	708	217	173	1077	735
52	565	855	164	107	1056	747
53	872	678	410	343	482	575
54	887	802	452	360	1361	1104
55	899	994	948	506	1134	1083

TABLE AII.119 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
56	690	1054	646	714	1071	1429
57	886	788	406	327	1253	1047
58	1269	662	---	780	809	973
59	---	---	635	542	1223	1077
60	878	454	613	380	868	539
61	974	932	431	557	1148	921
62	1171	956	81	378	684	1271
63	1053	859	572	660	1421	734
64	1520	1146	539	706	958	1300
65	1388	730	495	546	1192	649
66	1254	1167	733	705	1486	607
96	1040	1000	1164	1123	914	1148
97	891	597	828	741	680	709
98	730	797	864	793	1046	984

TABLE AII.120

RESTING URINARY OSMOLAR EXCRETION: FLIGHT 4
(μOsm/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	1321	829	518	358	1341	1074
68	745	661	378	244	1457	---
69	750	494	402	498	911	780
70	461	771	408	272	1004	898
71	596	717	193	208	1325	1090
72	694	599	232	177	1052	768
73	863	568	242	137	---	---
74	1043	748	217	146	1061	814
75	561	537	522	484	548	763
76	524	574	623	423	948	616
77	426	479	---	---	---	---
78	745	648	629	595	1027	843
79	945	682	478	461	832	576
80	789	717	391	356	858	796
81	698	614	470	573	819	728
82	---	1501	435	---	---	1136
83	1073	984	537	446	1467	1334
84	760	670	430	372	935	1146
85	543	481	463	377	1105	630
86	536	444	398	423	974	751
87	776	807	---	---	---	655
88	965	781	---	---	---	---
99	753	421	670	133	403	518
100	615	535	956	630	784	1202
101	937	723	1143	719	732	452

TABLE AII.121

RESTING MINUTE URINARY CREATININE EXCRETION: FLIGHT 1
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	1.30	1.19	0.88	0.78	0.92	1.16
2	1.26	1.20	----	----	----	1.21
3	1.06	1.03	0.99	1.38	0.92	0.98
4	1.27	1.18	0.89	1.55	1.30	1.25
5	0.98	1.20	----	----	----	0.95
6	1.46	1.34	1.22	1.01	1.27	1.26
7	1.13	1.42	1.24	1.09	1.15	1.43
8	1.18	1.17	0.86	0.95	0.73	1.07
9	1.40	1.52	1.52	1.68	1.37	1.36
10	0.98	1.20	1.51	1.57	0.98	1.04
11	1.17	1.53	1.58	1.70	1.15	1.30
12	0.98	1.62	1.92	2.10	1.34	1.61
13	1.05	1.17	0.89	----	----	----
14	1.03	1.28	1.06	1.29	0.93	1.31
15	1.38	1.62	1.59	0.94	0.78	----
16	1.36	1.37	1.32	----	----	----
17	1.49	(1.32)	1.29	1.35	1.16	1.81
18	1.19	1.21	1.32	1.09	0.37	1.25
19	1.30	1.33	1.13	1.17	1.39	0.99
20	0.95	1.42	1.40	----	----	----
21	1.04	1.35	1.32	1.23	1.24	1.25
22	1.10	1.27	1.26	1.39	0.95	1.06
90	1.30	1.47	1.53	1.87	1.68	1.66
91	----	2.11	1.74	1.73	2.07	1.56
92	0.97	1.13	1.31	1.37	1.19	1.27

TABLE AII.122

RESTING MINUTE URINARY CREATININE EXCRETION: FLIGHT 2
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	1.17	1.42	1.40	1.08	2.05	1.31
24	0.85	0.94	1.02	0.79	----	----
25	0.93	1.18	0.80	0.85	1.23	1.11
26	0.81	1.28	1.14	0.77	0.85	0.97
27	0.86	0.95	1.14	0.82	0.63	0.85
28	1.47	1.36	1.35	1.33	0.96	1.10
29	1.33	1.18	1.73	0.97	0.78	1.36
30	----	1.18	1.36	0.89	1.04	1.10
31	1.28	1.61	1.81	1.09	1.03	1.22
32	1.02	1.27	1.18	1.34	1.10	0.87
33	1.17	1.42	1.48	1.67	0.90	1.03
34	0.97	1.17	1.53	1.48	0.77	0.92

TABLE AII.122 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	1.15	1.28	1.42	1.07	0.80	1.03
36	0.93	1.36	1.39	0.76	1.11	1.10
37	1.24	1.66	1.70	1.19	1.15	1.22
38	0.49	1.39	1.57	0.96	1.10	1.20
39	1.00	1.43	1.57	1.15	----	----
40	1.50	(1.32)	----	1.44	1.15	----
41	1.09	1.46	1.17	----	----	1.12
42	1.60	1.58	1.74	1.01	1.05	1.25
43	1.77	1.27	1.57	1.73	1.02	1.17
44	1.62	1.35	0.91	1.40	1.05	1.16
93	1.03	----	----	----	----	----
94	2.34	4.70	2.21	1.81	1.33	2.05
95	1.56	1.40	1.62	1.58	1.27	1.77
102	----	----	----	1.33	0.90	1.49

TABLE AII.123

RESTING MINUTE URINARY CREATININE EXCRETION: FLIGHT 3
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.42	1.55	0.94	0.96	1.07	1.17
46	1.54	1.82	0.98	1.24	0.95	1.20
47	1.57	1.73	1.18	0.96	0.98	1.24
48	1.29	1.91	0.98	0.84	1.50	1.27
49	1.22	1.40	1.02	1.30	1.13	1.12
50	1.30	1.42	0.85	1.03	1.27	1.10
51	1.38	1.60	1.02	1.38	1.35	1.25
52	1.56	1.80	1.08	1.23	1.48	1.47
53	1.34	1.43	0.95	1.26	0.96	1.06
54	1.39	1.38	1.10	1.26	1.34	1.29
55	1.23	1.21	1.10	1.43	0.96	1.00
56	1.26	1.30	1.23	1.55	1.52	1.34
57	1.61	1.67	1.23	1.41	1.51	1.48
58	1.72	1.52	----	1.27	1.20	1.24
59	(1.42)	(1.56)	1.08	1.53	1.34	1.43
60	1.34	1.45	0.89	1.30	1.32	1.22
61	1.35	1.58	1.17	1.52	1.43	1.46
62	1.48	1.33	0.36	1.33	0.60	1.12
63	1.68	1.41	1.24	1.57	1.20	1.05
64	1.91	1.97	1.84	2.15	1.34	1.77
65	1.55	1.37	1.39	1.56	1.47	1.33
66	1.70	1.85	1.76	1.43	1.76	1.39
96	1.77	1.69	2.12	1.93	1.59	2.15
97	1.45	1.29	1.55	1.38	1.07	1.59
98	0.99	1.05	1.52	1.50	1.29	1.63

TABLE AII.124

RESTING MINUTE URINARY CREATININE EXCRETION: FLIGHT 4
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	1.31	1.24	1.01	1.19	1.15	1.09
68	1.49	1.33	1.26	1.27	1.32	----
69	1.55	1.32	1.21	1.23	1.24	1.21
70	0.75	1.12	1.38	1.18	1.08	1.22
71	1.27	1.24	1.13	1.22	1.32	1.20
72	1.36	1.38	0.61	1.14	1.33	1.15
73	1.32	1.28	1.23	1.33	----	----
74	1.44	1.32	1.45	1.47	1.09	1.11
75	1.37	1.12	1.55	1.50	1.07	1.23
76	1.29	1.32	1.55	1.08	0.98	1.08
77	1.19	1.89	----	----	----	----
78	1.19	1.14	1.42	1.28	1.32	1.15
79	1.50	1.43	1.44	1.40	1.19	0.94
80	1.34	1.28	1.26	1.45	1.20	1.02
81	1.43	1.40	1.34	1.44	1.40	1.10
82	(1.30)	1.46	0.98	----	----	1.82
83	1.33	1.47	1.45	1.34	1.52	1.35
84	1.40	1.26	1.40	1.14	1.19	1.20
85	0.98	0.90	1.43	1.20	1.40	1.21
86	1.16	1.21	1.43	1.16	1.27	0.99
87	1.32	1.47	----	----	----	1.34
88	1.26	1.20	----	----	----	----
99	1.42	1.22	1.13	1.00	1.21	1.38
100	1.63	1.45	1.88	1.36	1.53	1.89
101	1.45	1.30	1.60	1.37	1.38	1.52

TABLE AII.125

RESTING MINUTE URINARY CREATINE EXCRETION: FLIGHT 1
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.00	0.26	0.21	0.39	0.16	0.13
2	0.00	0.32	----	----	----	0.08
3	0.08	0.33	0.19	0.00	0.32	0.19
4	0.05	0.39	0.16	0.57	0.23	0.18
5	0.07	0.19	----	----	----	0.17
6	0.23	0.31	0.13	0.27	0.49	0.21
7	0.09	0.28	0.05	0.42	0.52	0.00
8	0.18	0.38	0.22	0.22	0.36	0.13
9	0.14	0.24	0.51	0.65	0.39	0.18
10	0.22	0.26	0.08	0.41	0.45	0.08
11	0.18	0.26	0.39	0.54	0.87	0.20
12	0.14	0.20	0.39	0.59	0.49	0.20

TABLE AII.125 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	0.33	0.48	0.13	----	----	----
14	0.15	0.34	0.24	0.24	0.57	0.18
15	0.32	0.28	0.18	0.38	0.35	----
16	0.07	0.48	0.16	----	----	----
17	0.12	(0.30)	0.33	0.35	0.28	0.51
18	0.15	0.21	0.00	0.24	0.32	0.06
19	0.06	0.09	0.20	0.45	0.42	0.20
20	0.05	0.41	0.00	----	----	----
21	0.18	0.34	0.16	0.46	0.33	0.08
22	0.00	0.20	0.18	0.46	0.26	0.21
90	0.10	0.00	0.00	0.00	0.18	0.35
91	----	0.00	0.00	0.00	0.23	0.25
92	0.03	0.06	0.00	0.00	0.23	0.33

TABLE AII.126

RESTING MINUTE URINARY CREATINE EXCRETION: FLIGHT 2
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.00	0.37	0.08	0.62	0.33	0.11
24	0.06	0.29	0.38	0.89	----	----
25	0.13	0.23	0.53	0.43	0.52	0.00
26	0.02	0.17	0.40	0.61	0.55	0.13
27	0.19	0.34	0.00	0.23	0.41	0.07
28	0.00	0.20	0.00	0.31	0.38	0.00
29	0.05	0.71	0.00	0.00	0.56	0.17
30	----	0.16	0.00	0.49	0.48	0.24
31	0.21	0.17	0.00	0.23	0.67	0.15
32	0.22	0.40	0.00	0.30	0.38	0.30
33	0.07	0.26	0.14	0.59	0.60	0.27
34	0.07	0.23	0.00	0.74	0.38	0.02
35	0.00	0.03	0.00	0.33	0.48	0.16
36	0.14	0.37	0.00	0.38	0.39	0.07
37	0.37	0.00	0.00	0.41	0.66	0.28
38	0.29	0.09	0.00	0.57	0.50	0.20
39	0.51	0.00	0.00	0.45	----	----
40	0.95	(0.20)	----	0.53	0.44	----
41	0.41	0.15	0.62	----	----	0.19
42	0.00	0.03	0.00	0.36	0.58	0.03
43	0.20	0.00	0.00	0.23	0.19	0.11
44	0.00	0.08	0.00	0.00	0.51	0.00
93	0.14	----	----	----	----	----
94	0.27	0.88	0.00	0.00	0.24	0.20
95	0.00	0.24	0.00	0.00	0.22	0.42
102	----	----	----	0.00	0.46	0.43

TABLE AII.127

RESTING MINUTE URINARY CREATINE EXCRETION: FLIGHT 3
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.60	0.03	0.41	0.12	0.71	0.36
46	0.18	0.13	0.21	0.00	0.61	0.58
47	0.00	0.17	0.13	0.00	0.74	0.29
48	0.00	0.00	0.31	0.02	0.00	0.54
49	0.00	0.14	0.00	0.00	0.00	0.24
50	0.00	0.08	0.13	0.00	0.00	0.32
51	0.02	0.00	0.20	0.17	0.20	0.34
52	0.00	0.00	0.12	0.00	0.00	0.20
53	0.00	0.08	0.18	0.12	0.00	0.37
54	0.14	0.13	0.15	0.10	0.12	0.29
55	0.00	0.40	0.23	0.00	0.27	0.43
56	0.00	0.40	0.08	0.17	0.00	0.11
57	0.19	0.00	0.16	0.00	0.00	0.37
58	0.31	0.46	----	0.25	0.00	0.34
59	(0.18)	(0.21)	0.22	0.00	0.03	0.34
60	0.25	0.18	0.32	0.20	0.09	0.37
61	0.20	0.25	0.08	0.05	0.03	0.15
62	0.22	0.42	0.09	0.00	0.03	0.30
63	0.32	0.44	0.27	0.12	0.00	0.29
64	0.51	0.45	0.00	0.00	0.00	0.29
65	0.49	0.30	0.00	0.00	0.03	0.22
66	0.32	0.38	0.00	0.03	0.00	0.51
96	0.23	0.03	0.00	0.12	0.54	0.34
97	0.00	0.00	0.00	0.05	0.41	0.29
98	0.00	0.22	0.00	0.00	0.29	0.22

TABLE AII.128

RESTING MINUTE URINARY CREATINE EXCRETION: FLIGHT 4
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.22	0.39	0.00	0.06	0.07	0.32
68	0.07	0.31	0.05	0.00	0.00	----
69	0.30	0.45	0.00	0.11	0.00	0.38
70	0.20	0.43	0.00	0.00	0.00	0.19
71	0.02	0.55	0.00	0.00	0.09	0.35
72	0.35	0.23	0.36	0.15	0.00	0.08
73	0.29	0.54	0.15	0.00	----	----
74	0.22	0.43	0.00	0.13	0.00	0.42
75	0.17	0.27	0.00	0.13	0.00	0.13
76	0.00	0.53	0.00	0.00	0.18	0.00
77	0.08	0.32	----	----	----	----
78	0.08	0.27	0.00	0.19	0.05	0.24

TABLE AII.128 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	0.00	0.40	0.00	0.04	0.03	0.24
80	0.13	0.32	0.00	0.13	0.00	0.21
81	0.23	0.45	0.00	0.00	0.00	0.27
82	(0.12)	0.35	0.00	----	----	0.32
83	0.00	0.28	0.00	0.04	0.00	0.38
84	0.00	0.28	0.00	0.02	0.00	0.35
85	0.00	0.37	0.00	0.00	0.24	0.19
86	0.06	0.25	0.00	0.13	0.00	0.56
87	0.28	0.42	----	----	----	0.35
88	0.08	0.42	----	----	----	----
99	0.17	0.08	0.00	0.30	0.32	0.32
100	0.14	0.25	0.00	0.06	0.21	0.32
101	0.12	0.00	0.00	0.10	0.08	0.43

TABLE AII.129

RESTING MINUTE URINARY UREA NITROGEN EXCRETION: FLIGHT 1
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	11.4	7.4	9.4	7.2	10.1	11.3
2	8.1	10.1	----	----	----	16.1
3	8.0	6.8	11.7	10.3	10.6	13.0
4	11.3	12.7	17.5	9.0	18.0	18.3
5	13.2	14.9	9.1	----	----	18.4
6	15.1	16.5	13.3	4.9	24.1	24.7
7	9.1	13.1	12.4	2.7	16.2	21.1
8	6.4	8.2	4.8	1.1	15.2	12.8
9	9.2	10.8	16.7	13.8	17.1	12.8
10	8.5	12.3	11.4	16.2	16.0	10.4
11	15.3	19.6	19.7	18.4	24.2	14.0
12	9.6	16.8	13.1	18.6	18.3	20.0
13	13.7	15.4	8.1	----	----	----
14	10.6	17.1	5.8	7.5	18.1	16.5
15	17.6	15.7	6.1	3.5	7.4	----
16	11.7	20.3	2.6	----	----	----
17	13.2	(11.4)	8.5	10.3	11.8	21.0
18	13.1	15.4	8.9	8.4	5.4	15.8
19	12.2	11.9	10.7	11.1	16.0	7.0
20	9.0	12.1	8.7	----	----	----
21	13.0	12.4	9.5	9.4	13.7	15.1
22	11.0	14.1	11.4	14.4	12.8	13.6
90	12.3	16.8	15.3	10.2	12.4	12.4
91	7.6	23.9	18.5	26.5	24.1	15.1
92	7.8	14.1	7.3	13.5	10.1	8.1

TABLE AII.130

RESTING MINUTE URINARY UREA NITROGEN EXCRETION: FLIGHT 2
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	10.6	10.3	11.0	10.3	18.1	12.9
24	8.3	7.4	9.2	11.7	----	----
25	7.7	6.6	15.8	11.8	12.1	14.0
26	9.1	11.4	14.6	10.3	11.2	10.3
27	9.1	8.9	8.4	7.7	12.4	9.2
28	13.8	11.0	10.3	7.3	11.0	11.7
29	12.8	8.4	9.7	----	7.6	10.4
30	(10.4)	7.3	5.9	4.9	7.6	11.4
31	11.7	11.3	14.6	11.4	9.4	13.1
32	10.6	14.4	11.5	16.5	11.2	18.7
33	10.5	6.8	18.2	18.1	8.4	9.4
34	9.5	9.1	17.4	20.4	9.3	6.9
35	7.3	8.5	11.1	8.2	10.5	11.5
36	10.7	14.2	8.3	5.3	9.6	17.0
37	11.4	11.0	9.9	3.9	11.0	14.1
38	6.9	11.9	9.6	4.2	11.7	16.2
39	6.9	10.8	8.0	8.3	----	----
40	19.2	(10.0)	----	11.9	6.9	----
41	15.5	8.7	----	----	----	14.9
42	9.3	10.7	12.0	10.4	10.2	16.6
43	10.6	9.9	11.3	12.7	7.8	9.2
44	7.5	11.5	12.1	14.0	15.1	14.0
93	(8.1)	----	----	----	----	----
94	20.0	----	10.5	12.8	14.5	11.6
95	12.3	21.7	8.7	12.0	11.7	9.8
102	----	----	----	10.2	10.4	12.3

TABLE AII.131

RESTING MINUTE URINARY UREA NITROGEN EXCRETION: FLIGHT 3
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	(7.2)	13.6	10.0	5.5	10.6	18.2
46	9.2	11.0	7.5	8.2	11.5	25.8
47	14.1	14.0	6.4	3.9	10.6	15.0
48	14.1	15.5	9.1	2.9	15.0	24.7
49	12.8	11.2	7.6	5.0	15.0	19.8
50	9.8	11.2	5.4	3.2	12.4	11.7
51	12.3	7.3	5.1	2.8	12.8	10.0
52	10.1	10.6	4.4	2.3	15.8	8.5
53	12.1	10.3	9.0	7.1	12.6	12.3
54	12.2	12.2	12.8	10.0	18.7	10.4
55	13.1	14.0	16.1	12.0	9.6	14.3
56	11.8	11.9	17.1	16.9	15.6	15.7

TABLE AII.131 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	9.5	10.4	10.4	7.5	11.1	11.8
58	16.4	9.7	----	11.8	6.6	8.5
59	(12.4)	(10.8)	9.7	4.8	9.9	10.9
60	14.5	8.0	6.7	3.4	8.7	9.1
61	12.5	9.7	7.9	8.5	12.9	10.5
62	12.6	10.5	4.3	7.6	6.1	15.2
63	13.8	6.5	10.5	7.0	12.0	8.5
64	13.2	8.6	9.6	9.1	10.1	13.1
65	10.6	9.9	12.8	9.3	12.7	10.7
66	12.4	10.3	13.3	11.8	22.0	11.3
96	11.4	22.7	13.2	14.8	12.8	12.1
97	10.9	15.3	11.5	7.8	11.3	10.5
98	7.0	12.6	11.7	12.9	13.9	11.7

TABLE AII.132

RESTING MINUTE URINARY UREA NITROGEN EXCRETION: FLIGHT 4
(mg/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	13.1	7.2	8.5	4.7	17.0	12.0
68	10.9	7.0	9.6	4.8	17.8	----
69	12.0	5.9	8.3	7.4	14.0	11.5
70	5.9	9.1	10.4	7.2	12.2	10.0
71	8.4	6.0	9.6	5.4	13.2	12.0
72	9.7	7.8	----	4.8	11.3	10.7
73	11.4	9.9	7.3	2.9	----	----
74	8.7	15.0	7.5	2.9	12.3	11.1
75	9.5	8.2	16.1	10.9	8.8	11.3
76	8.5	10.0	20.6	9.1	11.6	8.3
77	6.6	6.1	----	----	----	----
78	8.2	8.4	9.3	15.0	11.6	10.2
79	8.8	10.3	10.9	9.0	11.9	8.0
80	11.8	9.8	10.9	7.3	13.5	7.7
81	10.0	11.9	15.4	5.6	15.4	9.6
82	(9.4)	9.2	7.5	----	----	12.3
83	6.9	11.9	12.9	7.2	17.4	14.7
84	9.5	9.2	14.0	7.8	12.7	14.7
85	6.4	7.0	12.0	8.6	14.3	8.3
86	6.5	9.8	10.1	8.1	11.9	7.2
87	12.1	11.1	----	----	----	7.8
88	13.7	11.2	----	----	----	----
99	7.8	9.9	7.0	8.4	9.7	5.9
100	11.2	12.8	10.0	10.2	9.3	10.7
101	9.4	11.4	11.3	14.6	13.8	9.6

TABLE AII.133

RESTING URINARY pH: FLIGHT 1

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	7.70	7.82	6.13	5.91	6.49	7.35
2	6.67	6.99	----	----	----	5.40
3	7.11	7.76	6.11	7.76	7.08	7.00
4	6.52	7.57	5.82	7.31	6.98	6.00
5	4.92	5.38	5.55	----	----	4.82
6	6.77	7.53	6.31	5.89	6.42	7.08
7	7.22	6.72	6.92	7.19	5.18	6.23
8	6.91	7.61	6.36	6.01	6.87	5.58
9	7.70	7.95	5.77	6.09	6.55	7.51
10	7.36	6.98	5.70	5.60	6.27	6.76
11	6.55	7.25	6.03	5.84	6.28	6.03
12	6.71	7.10	6.70	8.08	6.49	6.11
13	6.60	6.66	6.61	----	----	----
14	5.96	6.37	5.87	6.15	6.39	6.05
15	6.98	7.96	6.70	6.84	7.03	----
16	6.60	7.22	7.63	----	----	----
17	7.24	(7.11)	6.39	6.64	6.19	6.41
18	7.31	7.11	5.86	6.04	6.82	6.90
19	6.70	7.48	5.66	6.13	6.79	5.91
20	6.45	6.69	6.78	----	----	----
21	6.38	6.33	5.67	6.05	6.79	6.60
22	6.98	6.99	6.18	6.03	6.45	6.14
90	7.08	7.30	6.89	6.69	7.40	6.04
91	7.21	6.91	7.47	6.97	6.82	6.33
92	7.20	7.69	7.53	6.82	7.40	6.19

TABLE AII.134

RESTING URINARY pH: FLIGHT 2

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	7.80	8.43	5.60	5.27	6.63	7.99
24	7.85	8.07	5.51	5.43	----	----
25	6.60	6.17	5.62	5.53	6.65	7.24
26	6.74	6.80	5.88	5.71	6.09	7.10
27	6.95	7.16	5.63	5.58	5.23	6.57
28	6.30	7.45	5.45	5.39	6.43	7.01
29	6.70	7.46	5.91	5.44	7.01	7.15
30	(6.46)	7.04	5.90	5.68	7.34	7.78
31	5.40	7.08	5.21	7.91	7.24	5.42
32	5.80	7.31	5.61	6.28	7.40	7.60
33	7.20	7.14	5.55	5.36	7.23	7.69
34	6.65	6.12	5.39	5.48	6.57	8.01
35	5.97	7.08	5.62	6.02	6.52	7.45

TABLE AII.134 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
36	5.40	6.10	5.50	6.20	6.05	5.68
37	5.71	6.06	6.22	5.99	6.79	6.01
38	5.60	5.68	5.68	5.77	6.69	6.70
39	5.53	6.70	5.52	6.89	----	----
40	6.89	(6.95)	----	6.19	7.41	7.52
41	5.69	6.01	----	----	----	6.29
42	7.42	7.80	5.26	6.32	7.50	7.49
43	6.64	6.78	5.96	6.62	6.30	7.86
44	7.00	7.54	5.31	7.30	7.30	7.11
93	6.50	----	----	----	----	----
94	6.41	6.46	6.92	7.46	7.50	6.87
95	6.60	5.55	7.33	6.95	7.14	6.29
102	----	----	----	6.54	7.57	7.06

TABLE AII.135

RESTING URINARY pH: FLIGHT 3

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	7.54	7.78	5.69	5.45	7.36	6.67
46	6.68	7.52	5.29	5.13	5.78	6.38
47	7.43	7.51	5.65	5.77	7.46	6.61
48	7.67	7.44	5.38	5.82	5.91	5.72
49	7.44	6.87	6.20	6.04	6.82	6.50
50	7.28	7.27	6.05	5.68	6.30	6.19
51	7.98	8.20	7.83	7.24	7.61	6.68
52	7.70	7.53	7.25	5.96	7.11	6.13
53	7.74	7.88	5.91	5.93	7.49	7.13
54	7.12	7.89	5.29	5.30	7.21	7.11
55	7.14	7.32	6.36	6.09	7.10	6.74
56	7.22	7.51	5.46	5.89	6.29	6.22
57	7.23	7.81	5.49	5.25	6.75	5.40
58	7.51	6.37	----	----	7.52	7.12
59	(7.40)	(7.29)	7.59	7.21	7.32	6.90
60	7.31	6.74	7.32	6.99	7.15	7.51
61	7.17	6.69	6.04	7.01	6.52	7.03
62	7.50	7.54	7.31	7.15	7.30	7.07
63	7.30	7.04	7.01	7.29	6.38	6.24
64	7.35	7.25	7.06	7.13	6.92	6.82
65	7.36	5.81	6.11	7.28	6.16	5.40
66	7.79	7.20	6.81	7.41	6.37	5.71
96	5.75	5.26	5.47	5.59	5.91	5.21
97	7.74	8.04	7.29	7.72	7.49	6.69
98	5.48	6.68	5.76	6.32	6.08	5.89

TABLE AII.136

RESTING URINARY pH: FLIGHT 4

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	7.83	7.78	5.49	5.91	7.00	7.29
68	7.78	7.89	5.80	6.42	7.28	----
69	6.89	6.47	5.78	5.52	6.90	6.91
70	7.14	6.86	5.39	5.67	7.39	7.11
71	6.43	7.33	5.88	5.75	5.62	5.54
72	7.70	7.72	6.41	6.09	7.32	7.35
73	6.82	5.54	6.68	6.30	----	----
74	7.71	5.66	6.67	6.01	7.92	7.52
75	6.96	5.87	5.35	5.26	6.62	5.40
76	7.50	7.29	5.20	5.41	7.15	6.53
77	5.23	5.67	----	----	----	----
78	7.12	7.09	5.18	5.18	7.39	6.78
79	7.07	7.14	5.71	6.10	6.48	7.32
80	7.08	6.90	5.91	6.03	7.51	7.48
81	6.15	6.20	5.48	6.67	5.65	5.42
82	(7.04)	5.51	5.42	----	----	5.80
83	7.80	7.86	6.41	6.48	7.68	7.66
84	7.21	6.79	5.98	5.90	6.70	5.86
85	7.71	6.57	6.12	6.03	7.62	7.12
86	5.37	5.35	5.70	5.61	5.29	7.35
87	7.51	7.53	----	----	----	6.20
88	6.92	7.74	----	----	----	----
99	7.98	7.10	6.88	6.78	7.00	6.24
100	6.39	6.62	6.92	6.50	6.89	6.53
101	7.18	5.92	6.29	6.28	6.50	6.73

TABLE AII.137

RESTING URINARY TITRABLE ACIDITY: FLIGHT 1
(micro Eq/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.00	0.00	16.08	16.78	11.45	0.00
2	9.11	3.31	----	----	----	30.12
3	0.00	0.00	18.69	0.00	0.00	0.00
4	5.20	0.00	12.78	0.00	0.00	18.20
5	23.58	16.59	4.81	----	----	36.00
6	3.15	0.00	6.65	19.19	6.15	0.00
7	0.00	3.45	20.25	0.00	28.09	8.50
8	3.86	0.00	4.86	17.38	1.81	15.66
9	0.00	0.00	22.61	25.08	7.98	0.00
10	0.00	1.43	26.45	33.89	9.31	5.18
11	5.32	0.00	23.67	39.15	16.38	15.22
12	3.42	0.00	9.17	0.00	14.21	21.61

TABLE AII.137 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	5.16	2.85	12.15	----	----	----
14	12.85	9.23	17.90	13.50	12.06	19.06
15	0.00	0.00	6.60	4.73	0.00	----
16	9.99	0.00	0.00	----	----	----
17	0.00	(2.53)	20.23	12.15	12.18	20.57
18	0.00	0.00	13.80	17.00	2.43	0.00
19	5.66	0.00	12.74	17.02	3.93	9.42
20	7.48	2.95	2.79	----	----	----
21	11.84	11.98	17.16	18.83	1.67	4.88
22	0.00	1.41	10.99	19.04	11.93	13.49
90	0.00	0.00	3.30	2.68	0.00	17.71
91	0.00	1.40	0.00	0.00	3.55	13.86
92	0.00	0.00	0.00	0.00	0.00	13.97

TABLE AII.138

RESTING URINARY TITRABLE ACIDITY: FLIGHT 2
(micro Eq/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.00	0.00	28.24	12.26	10.28	0.00
24	0.00	0.00	28.24	7.65	----	----
25	7.74	12.87	26.40	17.99	13.70	0.00
26	10.48	2.84	22.09	19.20	12.33	0.00
27	1.13	0.00	24.75	12.21	24.06	7.44
28	7.82	0.00	21.41	11.43	7.54	0.00
29	7.26	0.00	12.11	15.40	0.00	0.00
30	(9.49)	2.40	10.12	9.84	0.00	0.00
31	26.25	0.00	30.59	0.00	0.00	36.45
32	24.20	0.00	17.46	11.39	0.00	0.00
33	0.00	0.00	24.50	32.25	0.00	0.00
34	6.08	11.40	26.41	29.33	6.19	0.00
35	12.20	1.42	20.85	11.52	7.18	0.00
36	17.68	18.40	24.24	4.43	13.55	18.89
37	16.12	16.00	14.44	7.12	2.74	13.80
38	8.64	17.40	22.08	13.60	3.55	4.98
39	21.19	7.15	19.32	0.00	----	----
40	2.49	(5.07)	----	6.96	0.00	0.00
41	19.12	12.44	----	----	----	13.98
42	0.00	0.00	23.92	6.88	0.00	0.00
43	8.29	4.24	13.75	5.10	11.08	0.00
44	2.69	0.00	21.31	0.00	0.00	0.00
93	9.48	----	----	----	----	----
94	14.01	14.39	0.00	0.00	0.00	1.36
95	10.96	25.74	0.00	0.00	0.00	13.96
102	----	----	----	3.19	0.00	0.00

TABLE AII.139

RESTING URINARY TITRABLE ACIDITY: FLIGHT 3
(micro Eq/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.00	0.00	23.68	16.06	0.00	3.64
46	7.02	0.00	17.42	17.64	17.21	1.12
47	0.00	0.00	19.92	12.18	0.00	3.64
48	0.00	0.00	27.20	10.12	21.35	29.92
49	0.00	6.85	6.35	4.60	0.00	6.08
50	0.00	0.00	5.78	5.49	9.09	13.42
51	0.00	0.00	0.00	0.00	0.00	6.10
52	0.00	0.00	0.00	4.37	0.00	16.47
53	0.00	0.00	16.00	10.99	0.00	0.00
54	0.00	0.00	26.24	16.75	0.00	0.00
55	0.00	0.00	10.20	10.26	0.00	3.36
56	0.00	0.00	23.59	16.67	12.72	14.36
57	0.00	0.00	15.35	11.05	1.79	6.18
58	0.00	10.80	----	0.00	0.00	0.00
59	(0.33)	(2.18)	0.00	0.00	0.00	0.00
60	0.00	4.87	0.00	0.00	0.00	0.00
61	0.00	8.32	10.92	0.00	10.20	0.00
62	0.00	0.00	0.00	0.00	0.00	0.00
63	0.00	0.00	0.00	0.00	8.88	12.15
64	0.00	0.00	0.00	0.00	0.00	0.00
65	0.00	14.55	10.42	0.00	8.99	25.62
66	0.00	0.00	4.74	0.00	13.73	21.44
96	17.01	31.40	24.08	6.45	17.85	40.18
97	0.00	0.00	0.00	0.00	0.00	7.93
98	16.08	5.51	14.96	7.35	17.77	19.72

TABLE AII.140

RESTING URINARY TITRABLE ACIDITY: FLIGHT 4
(micro Eq/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.00	0.00	38.20	15.12	0.00	0.00
68	0.00	0.00	22.33	5.70	0.00	----
69	2.99	10.54	26.28	21.85	0.00	0.00
70	0.00	2.66	27.41	11.94	0.00	0.00
71	6.20	0.00	15.13	9.87	18.38	20.02
72	0.00	0.00	9.00	8.60	0.00	0.00
73	1.46	12.78	3.65	4.41	----	----
74	0.00	20.72	5.80	4.12	0.00	0.00
75	2.50	11.98	25.16	22.56	5.99	22.78
76	0.00	0.00	33.87	19.85	0.00	9.42
77	17.23	13.96	----	----	----	----
78	0.00	0.00	32.76	27.26	0.00	4.02

TABLE AII.140 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	0.00	0.00	26.52	8.42	7.95	0.00
80	0.00	1.33	19.79	12.16	0.00	0.00
81	9.14	12.36	19.60	1.87	15.90	24.12
82	(2.72)	44.54	19.60	----	----	33.38
83	0.00	0.00	14.00	6.62	0.00	0.00
84	0.00	3.49	15.35	10.45	4.64	18.69
85	0.00	7.02	10.73	8.08	0.00	0.00
86	16.22	16.86	16.10	12.76	21.86	20.77
87	0.00	0.00	----	----	----	14.12
88	1.40	0.00	----	----	----	----
99	0.00	0.00	3.51	2.81	0.00	14.85
100	13.34	9.76	0.00	8.42	1.33	13.35
101	0.00	16.62	13.80	11.13	4.93	7.34

TABLE AII.141

RESTING URINARY LACTIC ACID: HARD WORK
(mEq/L)

Flight 1			Flight 2		
Subject Code No.	PRE II	EXP I	Subject Code No.	PRE II	EXP I
1	0.60	0.63	23	0.49	0.36
2	0.63	----	24	0.39	0.52
3	0.38	0.28	25	0.59	0.32
4	0.56	0.58	26	0.28	0.00
5	0.12	0.00	27	1.10	0.86
6	0.32	0.00	28	0.50	0.79
7	0.20	0.06	29	1.00	0.38
8	0.34	1.00	30	0.62	0.60
9	0.50	0.46	31	0.90	0.19
10	0.31	0.21	32	0.38	0.18
11	0.15	0.24	33	0.79	0.98
12	0.24	0.39	34	0.79	0.52
13	0.38	0.21	35	0.54	0.91
14	0.18	0.26	36	0.50	0.81
15	0.27	0.53	37	0.71	0.75
16	0.10	0.31	38	0.71	0.56
17	----	0.46	39	0.91	0.98
18	0.12	0.47	40	----	----
19	0.06	0.39	41	1.61	----
20	0.15	1.00	42	0.52	0.74
21	0.14	0.11	43	0.25	0.51
22	0.14	0.17	44	0.57	0.74
90	0.93	0.85	93	----	----
91	0.17	0.24	94	0.55	0.12
92	0.17	0.18	95	0.33	0.89
			102	----	----

TABLE AII.142

RESTING URINARY LACTIC ACID: LIGHT WORK
(mEq/L)

Flight 3			Flight 4		
Subject Code No.	PRE II	EXP I	Subject Code No.	PRE II	EXP I
45	0.66	0.43	67	0.46	0.26
46	0.37	0.11	68	1.32	0.36
47	0.21	0.92	69	0.92	0.19
48	0.10	0.79	70	0.67	0.68
49	0.90	0.31	71	0.61	0.26
50	0.49	0.58	72	0.90	----
51	0.39	0.41	73	0.79	0.29
52	0.47	0.55	74	0.81	0.07
53	0.45	0.27	75	0.67	0.40
54	0.78	0.65	76	0.61	0.35
55	0.14	0.27	77	0.96	----
56	0.77	0.56	78	0.25	0.40
57	0.49	0.08	79	0.51	0.39
58	0.00	----	80	0.46	0.96
59	----	0.20	81	0.47	0.32
60	0.58	0.04	82	0.67	0.79
61	0.55	0.27	83	0.46	0.78
62	0.86	0.00	84	0.43	0.62
63	0.37	0.08	85	0.80	0.83
64	0.30	0.20	86	0.78	0.83
65	1.11	0.59	87	0.85	----
66	0.56	0.19	88	0.65	----
96	0.63	0.10	99	1.18	0.41
97	0.59	0.50	100	0.42	0.22
98	0.20	0.32	101	0.40	0.19

TABLE AII.143

RESTING ADDIS COUNT: RED BLOOD CELLS - FLIGHT 1
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	---	---	---	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	26.8	0.0
5	0.0	0.0	0.0	----	---	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	6.1	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	8.4	15.8	0.0	0.0
11	0.0	0.0	0.0	27.7	0.0	0.0
12	0.0	0.0	36.2	66.3	0.0	0.0

TABLE AII.143 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	0.0	0.0	0.0	---	---	---
14	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	---
16	0.0	0.0	11.2	---	---	---
17	0.0	(0.0)	0.0	0.0	0.0	0.0
18	0.0	0.0	11.2	0.0	0.0	0.0
19	0.0	0.0	18.1	0.0	0.0	0.0
20	0.0	0.0	0.0	---	---	---
21	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0
90	0.0	0.0	0.0	0.0	0.0	0.0
91	0.0	0.0	0.0	0.0	0.0	0.0
92	0.0	0.0	0.0	0.0	0.0	0.0

TABLE AII.144

RESTING ADDIS COUNT: RED BLOOD CELLS - FLIGHT 2
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	---	---
25	0.0	0.0	0.0	6.4	0.0	0.0
26	0.0	0.0	0.0	7.6	0.0	0.0
27	0.0	0.0	0.0	12.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	4.0	0.0	0.0
30	(0.0)	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	2.3	0.0	0.0	0.0
32	0.0	0.0	4.3	0.0	0.0	0.0
33	0.0	0.0	0.0	6.7	0.0	0.0
34	0.0	0.0	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0	0.0	33.2
39	0.0	0.0	0.0	6.0	---	---
40	(0.0)	(0.0)	---	0.0	0.0	0.0
41	0.0	0.0	---	---	---	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0	0.0	0.0
93	0.0	---	---	---	---	---
94	0.0	0.0	0.0	0.0	0.0	0.0
95	0.0	0.0	0.0	0.0	0.0	0.0
102	---	---	---	---	0.0	---

TABLE AII.145

RESTING ADDIS COUNT: RED BLOOD CELLS - FLIGHT 3
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.0	0.0	7.9	23.3	0.0	0.0
46	0.0	0.0	5.5	36.0	0.0	0.0
47	0.0	0.0	0.0	27.3	0.0	0.0
48	0.0	0.0	12.0	60.0	0.0	0.0
49	43.8	0.0	14.9	14.1	0.0	0.0
50	0.0	0.0	0.0	4.3	0.0	0.0
51	0.0	0.0	0.0	31.0	0.0	0.0
52	0.0	0.0	0.0	277.2	0.0	0.0
53	0.0	0.0	0.0	4.4	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	10.1	18.8	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0
57	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	----	0.0	0.0	0.0
59	(0.0)	(0.0)	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	6.3	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0
96	23.6	0.0	0.0	0.0	0.0	0.0
97	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0

TABLE AII.146

RESTING ADDIS COUNT: RED BLOOD CELLS - FLIGHT 4
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.0	0.0	7.1	88.4	0.0	0.0
68	0.0	91.2	7.7	0.0	0.0	----
69	0.0	0.0	10.9	0.0	0.0	0.0
70	0.0	0.0	5.3	4.0	0.0	0.0
71	0.0	0.0	186.0	0.0	0.0	0.0
72	0.0	0.0	0.0	10.0	0.0	0.0
73	0.0	0.0	17.3	0.0	----	----
74	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	10.0	47.3	39.2
76	0.0	0.0	10.3	22.4	0.0	0.0
77	0.0	0.0	----	----	----	----
78	0.0	0.0	0.0	14.4	0.0	0.0

TABLE AII.146 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	0.0	0.0	18.4	0.0	0.0	0.0
80	0.0	0.0	16.8	0.0	0.0	0.0
81	0.0	0.0	0.0	0.0	0.0	0.0
82	(0.0)	0.0	109.2	---	---	0.0
83	0.0	0.0	21.6	0.0	0.0	0.0
84	0.0	0.0	0.0	0.0	0.0	0.0
85	0.0	0.0	0.0	17.1	0.0	0.0
86	0.0	0.0	0.0	6.0	0.0	0.0
87	0.0	0.0	---	---	---	10.5
88	0.0	0.0	---	---	---	---
99	0.0	0.0	0.0	0.0	0.0	0.0
100	0.0	0.0	0.0	330.7	0.0	0.0
101	0.0	0.0	0.0	0.0	0.0	0.0

TABLE AII.147

RESTING ADDIS COUNT: CASTS - FLIGHT 1
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.0	0.0	13.6	0.0	0.0	0.0
2	0.0	0.0	---	---	---	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	3.7	0.0	0.0	0.0
5	0.0	0.0	2.1	---	---	0.0
6	0.0	0.0	0.0	10.9	0.0	0.0
7	0.0	0.0	16.1	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	---	---	---
14	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	---
16	0.0	0.0	0.0	---	---	---
17	0.0	(0.0)	0.0	0.0	0.0	0.0
18	0.0	0.0	11.2	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	---	---	---
21	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0
90	0.0	0.0	0.0	0.0	0.0	0.0
91	0.0	0.0	0.0	0.0	0.0	0.0
92	0.0	0.0	0.0	0.0	0.0	0.0

TABLE AII.148

RESTING ADDIS COUNT: CASTS - FLIGHT 2
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.0	0.0	10.1	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	---	---
25	0.0	0.0	0.0	172.8	0.0	0.0
26	0.0	0.0	0.0	7.6	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	0.0
30	(0.0)	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0
32	0.0	0.0	8.5	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0	0.0	0.0
34	0.0	0.0	6.9	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0	---	---
40	0.0	(0.0)	---	0.0	0.0	0.0
41	0.0	0.0	---	---	---	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0	0.0	0.0
93	0.0	---	---	---	---	---
94	0.0	0.0	0.0	0.0	0.0	0.0
95	0.0	0.0	0.0	0.0	0.0	0.0
102	---	---	---	---	0.0	---

TABLE AII.149

RESTING ADDIS COUNT: CASTS - FLIGHT 3
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.0	0.0	0.0	21.0	0.0	0.0
46	0.0	0.0	273.0	18.0	0.0	0.0
47	0.0	0.0	12.0	49.2	0.0	0.0
48	0.0	0.0	0.0	300.0	0.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0
51	0.0	0.0	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	0.0	0.0	0.0

TABLE AII.149 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	0.0	0.0	0.0	0.0	0.0	0.0
58	0.0	0.0	---	0.0	0.0	0.0
59	(0.0)	(0.0)	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0
96	0.0	0.0	0.0	0.0	0.0	0.0
97	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0

TABLE AII.150

RESTING ADDIS COUNT: CASTS - FLIGHT 4
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.0	0.0	7.1	0.0	0.0	0.0
68	0.0	0.0	0.0	0.0	0.0	---
69	0.0	0.0	16.4	0.0	0.0	0.0
70	0.0	0.0	80.0	0.0	0.0	0.0
71	10.9	0.0	372.0	0.0	0.0	0.0
72	0.0	0.0	0.0	0.0	0.0	0.0
73	0.0	0.0	0.0	0.0	---	---
74	0.0	0.0	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0	0.0	0.0
76	0.0	0.0	0.0	0.0	0.0	0.0
77	0.0	0.0	---	---	---	---
78	0.0	7.2	7.2	7.2	0.0	0.0
79	0.0	0.0	0.0	0.0	0.0	0.0
80	0.0	0.0	5.6	0.0	0.0	0.0
81	0.0	0.0	0.0	0.0	0.0	0.0
82	(0.0)	0.0	21.8	---	---	0.0
83	0.0	0.0	0.0	0.0	0.0	0.0
84	0.0	0.0	0.0	0.0	0.0	0.0
85	0.0	0.0	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0
87	0.0	0.0	---	---	---	0.0
88	0.0	0.0	---	---	---	---
99	0.0	0.0	0.0	0.0	0.0	0.0
100	0.0	0.0	0.0	0.0	0.0	0.0
101	0.0	0.0	0.0	0.0	0.0	0.0

TABLE AII.151

RESTING ADDIS COUNT: EPITHELIAL CELLS - FLIGHT 1
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.0	0.0	22.6	5.6	0.0	14.9
2	0.0	33.3	---	---	---	0.0
3	0.0	56.4	25.3	0.0	10.1	0.0
4	12.8	21.3	33.6	50.6	0.0	0.0
5	0.0	0.0	19.2	---	---	0.0
6	0.0	21.2	18.0	16.4	0.0	0.0
7	121.5	0.0	64.5	18.4	0.0	90.6
8	0.0	15.5	18.0	25.2	96.3	26.4
9	27.0	27.7	6.1	94.8	0.0	0.0
10	24.2	24.5	16.8	15.8	35.5	0.0
11	0.0	0.0	45.6	41.6	0.0	0.0
12	60.7	27.9	326.4	66.3	216.5	52.3
13	24.2	29.6	62.4	---	---	---
14	0.0	0.0	0.0	19.0	0.0	0.0
15	0.0	0.0	30.0	21.0	33.1	---
16	62.3	0.0	22.4	---	---	---
17	14.5	(19.8)	44.8	15.7	14.5	14.9
18	0.0	80.8	22.4	16.4	0.0	0.0
19	80.4	0.0	244.8	25.0	0.0	7.1
20	80.7	78.6	94.8	---	---	---
21	78.8	0.0	85.2	0.0	44.5	74.3
22	89.0	0.0	0.0	0.0	48.9	0.0
90	136.7	589.3	148.8	54.9	34.1	21.6
91	0.0	0.0	88.0	48.1	0.0	17.6
92	119.9	45.1	0.0	47.9	9.3	15.2

TABLE AII.152

RESTING ADDIS COUNT: EPITHELIAL CELLS - FLIGHT 2
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	102.6	0.0	15.2	9.1	70.7	26.4
24	71.9	0.0	16.4	24.0	---	---
25	33.6	0.0	20.0	32.0	94.4	0.0
26	122.4	0.0	45.6	152.0	0.0	0.0
27	75.6	20.8	150.0	24.0	45.2	66.1
28	0.0	16.4	20.7	13.6	0.0	35.6
29	27.4	7.5	35.2	2.7	30.1	17.1
30	51.8	0.0	4.8	8.8	24.4	26.9
31	130.4	12.5	40.8	35.2	0.0	0.0
32	65.5	49.6	115.2	20.0	124.7	33.3
33	0.0	15.5	68.4	22.4	0.0	75.6
34	108.5	14.4	124.8	20.0	0.0	0.0

TABLE AII.152 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	64.7	0.0	74.4	7.1	84.7	17.6
36	50.7	0.0	22.7	0.0	0.0	14.9
37	24.5	0.0	70.8	8.8	30.4	0.0
38	21.8	35.2	23.5	34.8	0.0	33.2
39	55.9	0.0	28.0	2.0	---	---
40	47.4	(9.4)	---	0.0	0.0	2.4
41	11.3	14.1	---	---	---	48.0
42	38.6	10.8	67.2	16.2	18.7	0.0
43	0.0	0.0	129.6	12.0	16.8	29.6
44	36.5	0.0	13.1	35.6	56.1	71.9
93	63.9	---	---	---	---	---
94	69.9	0.0	0.0	0.0	0.0	45.4
95	60.7	32.1	74.4	0.0	75.2	0.0
102	---	---	---	---	118.4	---

TABLE AII.153

RESTING ADDIS COUNT: EPITHELIAL CELLS - FLIGHT 3
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.0	13.7	0.0	420.0	0.0	0.0
46	0.0	0.0	27.3	18.0	26.0	0.0
47	0.0	26.1	36.0	16.4	93.8	0.0
48	0.0	0.0	55.2	166.4	56.9	51.3
49	43.8	0.0	49.6	42.4	0.0	0.0
50	30.1	22.1	11.7	12.8	40.3	11.7
51	0.0	0.0	16.8	46.3	0.0	0.0
52	23.2	0.0	13.6	13.2	29.6	0.0
53	0.0	0.0	6.3	13.2	7.5	6.9
54	0.0	0.0	7.1	14.1	54.0	21.8
55	0.0	0.0	20.2	18.8	0.0	0.0
56	111.9	14.0	19.2	24.8	42.4	0.0
57	40.0	0.0	82.0	0.0	0.0	0.0
58	0.0	24.8	---	0.0	0.0	0.0
59	(10.9)	(10.7)	12.8	30.1	85.1	0.0
60	48.4	6.0	0.0	0.0	18.1	86.6
61	34.0	46.4	6.8	30.0	0.0	21.8
62	24.0	0.0	26.6	13.3	0.0	0.0
63	0.0	0.0	0.0	17.7	0.0	0.0
64	0.0	34.9	0.0	31.7	0.0	0.0
65	63.1	17.9	25.0	5.2	86.9	30.4
66	0.0	18.0	0.0	0.0	48.8	27.6
96	23.6	69.6	42.8	64.3	23.6	76.4
97	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	43.1	0.0

TABLE AII.154

RESTING ADDIS COUNT: EPITHELIAL CELLS - FLIGHT 4
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.0	0.0	35.3	5.2	46.3	0.0
68	36.4	7.9	5.1	15.5	43.9	---
69	0.0	14.9	27.3	16.0	43.3	0.0
70	14.3	0.0	26.6	18.0	36.8	31.4
71	21.8	18.1	227.3	13.1	0.0	18.0
72	0.0	6.9	11.6	10.0	0.0	0.0
73	0.0	7.7	17.3	10.5	---	---
74	0.0	22.1	0.0	14.4	0.0	31.2
75	34.6	19.2	16.2	10.0	0.0	26.1
76	15.2	8.7	71.8	39.2	0.0	8.3
77	96.0	10.3	---	---	---	---
78	0.0	21.6	7.2	0.0	0.0	20.8
79	0.0	0.0	27.6	13.9	16.7	13.2
80	0.0	24.5	50.4	37.2	54.8	20.8
81	0.0	11.2	0.0	16.7	19.6	59.1
82	(13.9)	37.9	27.3	---	---	0.0
83	41.1	0.0	28.8	0.0	91.2	0.0
84	0.0	8.3	151.2	9.3	17.9	41.3
85	16.0	16.8	6.0	8.5	0.0	8.8
86	15.5	0.0	13.3	18.0	19.6	11.8
87	0.0	16.8	---	---	---	10.3
88	0.0	0.0	---	---	---	---
99	40.3	216.0	2070.0	1115.1	1032.0	612.0
100	19.5	17.6	0.0	392.6	0.0	81.9
101	52.2	0.0	0.0	0.0	0.0	53.8

TABLE AII.155

RESTING ADDIS COUNT: WHITE BLOOD CELLS - FLIGHT 1
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.0	0.0	81.6	11.3	0.0	0.0
2	0.0	60.0	---	---	---	0.0
3	0.0	56.4	25.3	26.0	10.1	0.0
4	0.0	21.3	26.1	30.4	0.0	0.0
5	0.0	0.0	192.0	---	---	0.0
6	0.0	43.5	18.0	27.3	0.0	0.0
7	0.0	0.0	145.2	18.4	0.0	0.0
8	27.0	30.9	18.0	50.4	96.3	26.4
9	0.0	27.7	6.1	31.6	0.0	0.0
10	0.0	49.0	33.6	63.4	0.0	0.0
11	0.0	0.0	261.6	41.6	0.0	0.0
12	273.6	250.8	2448.0	199.2	1499.4	104.8

TABLE AII.155 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	0.0	29.6	156.0	---	---	---
14	0.0	0.0	0.0	19.0	0.0	0.0
15	0.0	18.1	90.0	63.1	16.5	---
16	0.0	0.0	67.2	---	---	---
17	29.0	(35.4)	44.8	39.3	14.5	0.0
18	0.0	0.0	22.4	16.4	0.0	0.0
19	0.0	0.0	244.8	225.6	0.0	7.1
20	80.7	157.3	853.2	---	---	---
21	0.0	0.0	56.8	63.7	44.5	0.0
22	44.5	0.0	0.0	139.2	0.0	0.0
90	45.6	33.6	74.4	123.6	17.1	0.0
91	3.2	0.0	88.0	48.1	0.0	0.0
92	270.0	405.6	0.0	95.9	0.0	91.0

TABLE AII.156

RESTING ADDIS COUNT: WHITE BLOOD CELLS - FLIGHT 2
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	410.3	15.5	455.9	408.0	247.3	0.0
24	0.0	0.0	16.4	24.0	---	---
25	44.8	0.0	20.0	57.6	31.5	0.0
26	0.0	0.0	91.2	273.6	0.0	0.0
27	1890.0	2340.0	2099.8	540.0	1220.3	595.2
28	0.0	0.0	111.6	204.0	0.0	71.1
29	54.9	15.2	52.8	2.7	30.1	0.0
30	(199.9)	0.0	9.6	79.2	24.4	0.0
31	1176.0	225.6	40.8	35.2	0.0	32.4
32	108.1	0.0	230.4	40.0	49.9	0.0
33	0.0	46.4	136.8	201.6	0.0	0.0
34	88.5	194.4	62.4	69.9	0.0	0.0
35	21.6	0.0	148.8	7.1	42.4	0.0
36	152.4	0.0	81.6	0.0	0.0	0.0
37	0.0	0.0	173.1	8.8	30.4	0.0
38	109.2	27.3	105.6	104.4	0.0	0.0
39	55.9	28.3	56.0	24.0	---	---
40	47.4	(143.0)	---	0.0	0.0	0.0
41	0.0	14.1	---	---	---	0.0
42	38.6	97.2	336.0	73.2	18.7	0.0
43	0.0	0.0	194.4	12.0	42.0	159.8
44	0.0	0.0	13.1	35.6	56.1	107.9
93	0.0	---	---	---	---	---
94	23.3	40.4	0.0	0.0	0.0	45.4
95	0.0	32.1	99.2	0.0	150.4	0.0
102	---	---	---	---	59.2	---

TABLE AII.157

RESTING ADDIS COUNT: WHITE BLOOD CELLS - FLIGHT 3
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	100.7	13.7	15.7	126.0	0.0	0.0
46	0.0	0.0	98.4	30.0	78.0	0.0
47	0.0	0.0	36.0	27.3	93.8	0.0
48	156.6	0.0	1104.0	600.0	56.9	51.3
49	43.8	0.0	49.6	254.4	0.0	0.0
50	30.1	22.1	23.4	192.0	40.3	23.4
51	18.2	0.0	16.8	139.2	0.0	0.0
52	23.2	0.0	612.0	422.4	29.6	0.0
53	0.0	0.0	6.3	26.4	14.9	0.0
54	0.0	0.0	15.7	14.1	108.0	0.0
55	0.0	0.0	30.4	93.6	0.0	0.0
56	0.0	0.0	38.4	24.8	0.0	0.0
57	79.9	0.0	20.5	0.0	0.0	0.0
58	0.0	24.8	---	0.0	0.0	0.0
59	(21.6)	(18.4)	12.8	30.1	42.5	38.2
60	0.0	18.0	0.0	10.5	0.0	0.0
61	0.0	139.2	0.0	49.9	0.0	86.8
62	0.0	0.0	26.6	13.3	0.0	0.0
63	0.0	0.0	0.0	17.7	0.0	0.0
64	0.0	34.9	0.0	95.1	0.0	0.0
65	0.0	80.4	338.4	18.8	86.9	38.0
66	0.0	54.0	0.0	0.0	0.0	9.2
96	23.6	58.0	42.8	0.0	0.0	76.4
97	0.0	0.0	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0	43.1	0.0

TABLE AII.158

RESTING ADDIS COUNT: WHITE BLOOD CELLS - FLIGHT 4
(Thousands/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.0	0.0	91.6	36.4	0.0	0.0
68	36.4	0.0	182.4	30.9	43.9	---
69	0.0	14.9	49.2	16.0	0.0	0.0
70	14.3	0.0	79.7	14.4	28.4	31.4
71	21.8	18.1	186.0	26.1	0.0	0.0
72	0.0	13.9	19.3	30.0	0.0	32.0
73	39.1	14.1	60.6	31.6	---	---
74	0.0	66.1	0.0	14.4	0.0	31.2
75	62.4	576.0	7.3	10.0	170.4	26.1
76	15.2	8.7	41.0	123.2	76.0	8.3
77	288.0	201.6	---	---	---	---
78	9.5	64.8	64.8	64.8	0.0	0.0

TABLE AII.158 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	0.0	0.0	82.8	13.9	50.0	13.2
80	0.0	49.1	151.2	12.4	54.8	20.8
81	0.0	0.0	8.1	16.7	39.2	14.8
82	(24.9)	170.4	147.6	----	----	0.0
83	20.5	35.2	36.0	0.0	35.6	0.0
84	0.0	16.5	75.6	4.7	17.9	41.3
85	16.0	33.6	6.0	123.7	24.3	8.8
86	0.0	0.0	13.3	144.0	58.8	0.0
87	0.0	2520.0	---	---	---	20.5
88	0.0	0.0	---	---	---	---
99	3623.0	3024.0	5796.0	8009.8	5159.0	4284.0
100	19.5	0.0	0.0	971.3	16.4	81.9
101	52.2	0.0	0.0	169.6	0.0	53.8

TABLE AII.159

RESTING URINALYSIS: KETONURIA - FLIGHT 1
(0 to +4)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0	0	+4	0	0	0
2	0	0	-	-	-	0
3	0	0	+4	0	0	0
4	0	0	+4	tr	0	0
5	0	0	0	-	-	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	+4	+4	0	0
10	0	0	+4	+4	0	0
11	0	0	+1	+2	0	0
12	0	0	+4	+4	0	0
13	0	0	+4	-	-	-
14	0	0	+3	+4	0	0
15	0	0	+4	+3	0	-
16	0	0	+2	-	-	-
17	0	-	+2	+3	0	0
18	0	0	tr	tr	0	0
19	0	0	0	tr	0	0
20	0	0	0	-	-	-
21	0	0	0	0	0	0
22	0	0	0	0	0	0
90	0	0	0	0	0	0
91	0	0	0	0	0	0
92	0	0	0	0	0	0

TABLE AII.160

RESTING URINALYSIS: KETONURIA - FLIGHT 2
(0 to +4)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0	0	+4	+3	0	0
24	0	0	+3	+3	-	0
25	0	0	+4	+4	0	0
26	0	0	+4	+4	0	0
27	0	0	0	0	0	0
28	0	0	0	0	0	0
29	0	0	0	0	0	0
30	-	0	0	0	0	0
31	0	0	tr	0	0	0
32	0	0	+4	0	0	0
33	0	0	0	+1	0	0
34	0	0	+2	+4	0	0
35	0	0	0	+4	0	0
36	0	0	+4	+3	0	0
37	0	0	tr	+2	0	0
38	0	0	0	+1	0	0
39	0	0	tr	+1	-	-
40	0	-	-	0	0	0
41	0	0	-	-	-	0
42	0	0	0	+4	0	0
43	0	0	0	0	0	0
44	0	0	0	0	0	0
93	0	-	-	-	-	-
94	0	0	0	0	0	0
95	0	0	0	0	0	0
102	-	-	-	0	0	0

TABLE AII.161

RESTING URINALYSIS: KETONURIA - FLIGHT 3
(0 to +4)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0	0	+4	+4	0	0
46	0	0	+1	+1	0	0
47	0	0	+4	+4	0	0
48	0	0	+4	+4	0	0
49	0	0	0	tr	0	0
50	0	0	0	0	0	0
51	0	0	0	0	0	0
52	0	0	0	0	0	0
53	0	0	+4	+4	0	0
54	0	0	+4	+4	0	0
55	0	0	0	+2	0	0
56	0	0	+3	0	0	0

TABLE AII.161 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	0	0	0	+4	0	0
58	0	0	-	0	0	0
59	-	-	0	tr	0	0
60	0	0	0	+4	0	0
61	0	0	0	0	0	0
62	0	0	0	0	0	0
63	0	0	0	0	0	0
64	0	0	0	0	0	0
65	0	0	0	0	0	0
66	0	0	0	0	0	0
96	0	0	0	0	0	0
97	0	0	0	0	0	0
98	0	0	0	0	0	0

TABLE AII.162

RESTING URINALYSIS: KETONURIA - FLIGHT 4
(0 to +4)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0	0	+4	+4	0	0
68	0	0	+4	0	0	-
69	0	0	+4	+4	0	0
70	0	0	+4	0	0	0
71	0	0	0	0	0	0
72	0	0	0	0	0	0
73	0	0	0	0	-	-
74	0	0	tr	tr	0	0
75	0	0	+4	+4	0	0
76	0	0	+4	0	0	0
77	0	0	-	-	-	-
78	0	0	tr	+1	0	0
79	0	0	+4	+4	0	0
80	0	0	+3	+3	0	0
81	0	0	0	tr	0	0
82	-	0	+1	-	-	0
83	0	0	0	+1	0	0
84	0	0	0	+1	0	0
85	0	0	0	0	0	0
86	tr	0	0	0	0	0
87	0	0	-	-	-	0
88	0	0	-	-	-	-
99	0	0	0	0	0	0
100	0	0	0	0	0	0
101	0	0	0	0	0	0

TABLE AII.163

RESTING URINALYSIS: ALBUMIN, GLUCOSE, AND UROBILINOGEN
(0 to +4)

Period	Albumin	Glucose	Urobilinogen
PRE I	All specs neg.	All specs neg.	All specs neg.
PRE II	All specs neg.	tr(No.95)	tr(Nos. 5,6,27,30,37); +1(No.51)
EXP I	All specs neg.	tr(No.17)	All specs neg.
EXP II	tr(No.54); +2(Nos. 59,61,72)	All specs neg.	All specs neg.
REC I	All specs neg.	All specs neg.	All specs neg.
REC II	All specs neg.	All specs neg.	All specs neg.

TABLE AII.164

URINALYSIS: DAILY KETONURIA - FLIGHT 1
(Undiluted Urine)

Subject	P II					EXP I	EXP I			EXP II		REC I	
Code No.	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
1	0	0	3	4	4	4	4	4	4	4	tr	3	0
2	0	0	3	4	4	4	-	-	-	-	-	-	-
3	0	0	0	0	4	4	4	4	4	tr	2	0	0
4	0	0	4	4	4	4	4	4	4	tr	tr	0	0
5	0	0	0	0	0	0	tr	0	0	0	0	-	-
6	0	0	0	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	2	0	0	0
8	0	0	0	0	0	(0)	0	0	0	4	0	2	0
9	0	0	tr	4	4	4	4	4	4	4	4	3	0
10	0	0	3	4	4	4	4	4	4	4	4	0	0
11	0	0	0	0	0	3	4	2	4	3	2	tr	0
12	0	0	tr	4	4	4	4	4	4	tr	4	4	0
13	0	0	4	4	4	4	4	4	4	2	-	-	-
14	0	0	4	4	0	3	4	0	0	tr	2	0	0
15	0	0	1	4	0	4	4	4	2	1	3	1	0
16	0	0	0	0	0	4	4	3	0	tr	-	-	-
17	0	0	0	2	0	2	2	0	3	2	4	4	0
18	0	0	0	0	0	0	tr	0	2	0	0	0	0
19	0	0	0	0	tr	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	-	-	-
21	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	tr	0	0	0	0	0	0	0	0
91	0	0	0	0	tr	0	0	0	0	0	0	0	0
92	0	0	0	tr	0	0	tr	0	0	2	tr	0	0

TABLE AII.165

URINALYSIS: DAILY KETONURIA - FLIGHT 2
(Undiluted Urine)

Subject	P II		EXP I							EXP II		REC I	
Code No.	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
23	0	0	(0)	4	4	4	4	4	4	4	4	0	0
24	0	0	0	4	4	4	4	4	4	4	4	0	0
25	0	0	tr	4	4	4	4	4	4	4	4	0	0
26	0	0	0	4	4	4	4	4	4	4	4	0	0
27	0	0	0	0	0	0	0	0	1	0	0	0	0
28	0	0	0	0	0	0	0	0	1	0	0	0	0
29	0	0	0	0	0	0	0	0	1	1	0	0	0
30	0	0	0	0	4	0	0	0	2	2	0	0	0
31	0	0	4	4	4	4	3	0	0	4	0	0	0
32	0	0	4	4	1	4	4	4	4	4	4	0	0
33	0	0	1	2	4	4	tr	tr	3	4	4	tr	0
34	0	0	3	4	-	4	4	2	4	4	4	0	0
35	0	0	0	3	1	3	4	4	4	4	4	0	0
36	0	0	0	4	4	4	4	4	4	4	4	0	0
37	0	0	0	0	0	1	4	4	4	4	3	0	0
38	0	0	0	tr	1	tr	4	3	4	2	-	0	0
39	0	0	0	0	tr	0	tr	0	0	0	tr	0	0
40	0	0	0	0	0	0	0	0	0	1	0	0	0
41	0	0	0	0	-	-	-	-	-	-	-	-	-
42	0	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0	0	tr	0	0	0	0	0	0	0	0	0
44	0	0	0	tr	tr	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	tr	0	0	0	0
95	0	0	0	0	0	1	2	3	4	4	3	0	0
102	-	-	-	-	-	-	-	-	0	0	0	0	0

TABLE AII.166

URINALYSIS: DAILY KETONURIA - FLIGHT 3
(Undiluted Urine)

Subject	P II		EXP I							EXP II		REC I	
Code No.	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
45	0	0	0	0	tr	4	4	4	4	3	4	4	0
46	0	0	tr	4	tr	tr	4	4	4	4	3	1	0
47	0	0	0	2	4	4	4	4	4	4	4	4	0
48	0	0	0	2	tr	4	4	4	4	4	4	3	0
49	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	2	2	2	tr	tr	0
51	0	0	0	0	0	0	0	0	0	0	0	tr	0
52	0	0	0	0	0	0	0	0	0	0	tr	0	0
53	0	0	0	4	0	4	4	4	4	4	4	4	0
54	0	0	0	4	tr	4	4	4	4	4	tr	2	0
55	0	0	0	1	0	4	3	4	4	3	3	2	0
56	0	0	0	1	0	0	3	0	4	0	0	tr	0
57	0	0	0	1	0	4	4	4	4	3	0	4	0
58	0	0	0	0	0	0	0	0	0	0	0	0	0
59	-	-	0	0	0	1	tr	3	4	0	0	tr	0
60	0	0	0	4	0	4	0	4	4	0	0	2	0
61	0	0	0	0	0	0	0	2	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	1	tr	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	tr	0	tr	0	0	0	0	0	0
97	0	0	0	tr	0	0	0	2	0	3	tr	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE AII.167

URINALYSIS: DAILY KETONURIA - FLIGHT 4
(Undiluted Urine)

Subject	P II		EXP I							EXP II		REC I	
Code No.	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
67	0	0	4	4	4	4	4	4	4	4	4	4	1
68	0	0	4	4	4	4	4	4	4	tr	tr	tr	0
69	0	0	0	4	4	4	4	4	4	4	3	4	0
70	0	0	0	4	4	4	4	4	4	-	2	0	0
71	0	0	0	0	0	0	0	0	2	0	tr	0	0
72	0	0	0	0	0	0	0	0	0	2	0	tr	0
73	0	0	0	0	0	0	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0	2	1	2	0	0	0
75	0	0	0	4	4	4	4	4	4	4	4	3	0
76	0	0	2	4	-	4	4	4	4	4	4	3	0
77	0	0	2	-	-	-	-	-	-	-	-	-	-
78	0	0	0	1	2	3	2	4	2	4	4	1	0
79	0	0	tr	4	4	4	4	4	4	3	4	3	0
80	0	0	0	4	4	4	4	4	4	2	3	2	0
81	0	0	0	0	tr	tr	1	4	4	0	2	tr	0
82	0	0	0	tr	1	2	4	4	3	0	-	-	-
83	0	0	0	tr	0	0	0	2	2	0	tr	2	0
84	0	0	0	tr	tr	tr	tr	tr	1	0	4	2	0
85	0	0	0	0	0	0	0	0	tr	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	1	3	4	0	-	-	-
88	0	0	0	0	0	0	0	0	0	0	-	-	-
99	0	0	tr	tr	tr	tr	0	0	0	3	tr	0	0
100	0	0	0	0	tr	0	0	2	0	0	0	0	0
101	0	0	0	tr	0	0	0	0	0	0	0	0	0

TABLE AII.168

RESTING URINARY 17-KETOSTEROID EXCRETION: FLIGHT 1
(mg/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	2.5	1.7	0.8	0.6	0.8	1.3
2	2.2	1.2	---	---	---	1.1
3	1.2	1.2	0.6	0.7	0.8	0.9
4	2.4	1.7	0.8	1.3	1.4	1.8
5	1.7	1.8	0.4	---	---	1.4
6	1.5	1.1	0.9	0.5	0.9	1.4
7	1.4	1.5	0.8	0.8	1.1	1.2
8	0.9	0.8	0.4	0.3	0.7	0.5
9	1.8	1.6	0.9	0.8	1.2	0.9
10	1.2	1.3	0.9	0.8	0.9	1.0
11	1.4	1.3	1.0	0.7	1.5	1.0
12	0.9	1.6	1.1	0.8	1.2	1.4
13	1.2	1.7	0.8	---	---	---
14	1.6	1.9	1.0	0.6	0.7	1.6
15	1.2	1.5	1.0	0.8	0.7	---
16	0.9	1.0	0.6	---	---	---
17	1.7	---	1.0	0.6	0.9	2.1
18	1.1	1.2	1.0	0.8	0.5	1.1
19	1.2	1.2	1.2	1.0	1.5	0.8
20	0.8	0.9	1.0	---	---	---
21	2.3	1.2	1.3	1.0	1.1	1.0
22	1.4	1.2	1.2	1.0	1.0	0.9
90	2.6	1.8	1.3	1.1	2.0	1.5
91	1.3	2.2	1.4	1.4	2.0	1.6
92	1.5	1.0	1.1	0.7	1.1	1.0

TABLE AII.169

RESTING URINARY 17-KETOSTEROID EXCRETION: FLIGHT 2
(mg/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	1.1	0.9	0.5	0.3	0.9	0.8
24	1.0	0.6	0.5	0.3	---	---
25	0.8	0.9	0.6	0.4	0.8	0.8
26	1.4	1.1	0.4	0.6	0.7	0.8
27	1.1	0.9	0.7	0.6	0.8	1.0
28	1.1	1.3	0.8	0.7	0.9	1.2
29	1.5	2.0	0.8	0.8	1.4	1.4
30	---	1.0	0.7	0.6	0.6	1.0
31	1.4	2.0	---	1.2	0.9	1.8
32	1.2	1.0	0.5	0.7	1.0	1.1
33	1.2	1.1	1.0	0.9	1.0	1.1
34	1.5	1.0	0.8	1.0	0.8	1.1

TABLE AII.169 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	1.3	1.3	0.7	0.8	1.1	1.2
36	1.0	1.6	0.4	0.2	0.6	1.0
37	0.9	1.0	0.7	0.5	0.7	1.1
38	0.9	0.9	0.7	0.5	0.8	1.0
39	0.9	1.2	1.0	0.8	---	---
40	1.9	---	---	1.0	1.2	1.3
41	0.8	0.8	---	---	---	0.9
42	1.5	1.1	0.9	1.0	0.8	1.3
43	1.3	1.4	1.0	1.2	0.9	1.3
44	1.3	1.1	0.7	0.7	0.8	1.0
93	1.4	---	---	---	---	---
94	2.5	3.7	2.1	1.7	1.9	1.8
95	1.4	1.1	0.7	0.8	1.3	1.0
102	---	---	---	0.7	0.9	1.0

TABLE AII.170

RESTING URINARY 17-KETOSTEROID EXCRETION: FLIGHT 3
(mg/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	1.1	0.9	0.4	0.4	0.4	0.7
46	1.0	0.8	0.4	0.4	0.4	0.9
47	1.8	1.3	1.1	0.7	1.1	1.6
48	2.2	1.6	0.6	0.5	1.0	1.4
49	2.0	1.3	0.5	0.7	0.8	1.5
50	1.6	1.6	0.7	1.0	1.0	1.5
51	1.5	1.2	0.9	0.9	1.4	1.3
52	1.4	1.6	0.6	1.0	0.9	1.1
53	1.0	0.8	0.5	0.8	0.6	0.8
54	1.2	1.0	0.9	0.6	0.7	0.8
55	0.7	0.8	1.0	0.6	0.6	0.8
56	1.1	1.8	0.8	1.2	1.4	1.6
57	1.4	1.5	0.8	1.0	1.2	1.3
58	1.8	1.1	---	1.1	1.0	1.4
59	---	---	0.8	0.9	0.6	1.0
60	2.0	1.5	1.1	1.4	1.3	1.8
61	1.6	1.3	0.9	0.8	0.8	1.1
62	1.0	1.0	0.6	0.8	1.0	0.6
63	1.8	1.2	1.4	1.4	1.2	1.3
64	2.4	1.8	1.4	1.5	0.9	1.8
65	2.4	1.4	1.6	1.4	1.5	1.4
66	2.9	2.3	2.0	2.1	2.1	1.9
96	1.2	1.3	1.2	1.1	2.4	1.2
97	2.2	2.4	2.0	2.2	2.1	2.0
98	1.4	1.1	1.0	0.9	1.1	1.0

TABLE AII.171

RESTING URINARY 17-KETOSTEROID EXCRETION: FLIGHT 4
(mg/2hr)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	3.3	1.9	0.8	0.6	1.9	2.0
68	1.5	1.6	0.6	0.7	1.4	---
69	1.0	1.0	0.4	0.4	1.0	1.1
70	0.6	1.7	0.4	0.5	1.2	1.5
71	1.3	1.3	0.6	0.5	1.2	1.0
72	1.7	1.2	0.6	0.7	1.1	1.1
73	3.7	2.5	1.0	1.6	---	---
74	1.3	1.5	0.6	0.8	0.9	1.1
75	1.4	1.2	0.6	0.6	0.7	1.0
76	2.1	1.1	0.7	0.5	0.8	0.8
77	1.5	1.2	---	---	---	---
78	1.0	0.9	0.6	0.7	0.9	0.9
79	1.7	1.5	0.8	0.8	0.7	1.4
80	1.3	0.9	0.6	0.5	0.8	0.9
81	2.2	1.1	0.7	0.6	1.1	1.1
82	---	1.3	0.5	---	---	1.8
83	1.2	0.9	0.6	0.6	0.8	0.9
84	1.2	1.4	0.8	0.9	1.1	1.5
85	1.4	1.8	0.8	1.1	2.0	1.9
86	1.4	1.0	1.1	1.2	1.5	1.2
87	1.0	0.9	---	---	---	1.0
88	1.3	1.1	---	---	---	---
99	1.3	0.9	0.9	1.1	0.9	0.7
100	0.9	1.0	0.9	0.7	1.0	1.0
101	1.6	1.0	1.0	0.9	1.1	1.0

TABLE AII.172

MEAN DAILY FECAL WET WEIGHT: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	86	50	8	0	192	154
2	80	39	0	0	-	89
3	93	98	14	0	90	161
4	85	48	24	62	201	203
5	110	93	0	-	-	132
6	182	73	25	25	123	128
7	176	150	45	45	213	250
8	144	99	46	100	205	155
9	191	128	45	78	165	248
10	75	72	29	29	106	178
11	186	111	35	35	99	152
12	131	60	89	89	128	155

TABLE AII.172 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	79	96	26	-	-	-
14	145	172	87	87	96	218
15	133	85	29	29	-	-
16	136	120	56	-	-	-
17	106	101	71	71	125	118
18	79	91	41	41	95	208
19	109	94	68	66	200	99
20	86	114	81	-	-	-
21	113	89	126	72	150	165
22	105	82	84	65	183	178
90	166	216	163	147	147	231
91	66	127	94	95	95	132
92	113	158	117	143	143	246

TABLE AII.173

MEAN DAILY FECAL WET WEIGHT: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	109	78	20	20	141	314
24	119	62	20	20	88	-
25	194	98	23	84	292	282
26	166	70	9	9	114	236
27	160	67	55	55	158	182
28	131	108	12	12	136	216
29	161	75	29	29	97	113
30	130	97	72	72	138	177
31	114	97	83	91	91	153
32	119	111	30	36	155	95
33	194	157	61	81	159	202
34	100	98	54	66	130	181
35	124	50	58	58	109	185
36	83	138	28	28	98	193
37	96	44	65	75	151	141
38	72	46	23	15	69	183
39	131	85	76	29	138	-
40	86	119	69	150	150	180
41	175	79	-	-	-	181
42	254	134	76	76	146	175
43	110	87	123	66	185	209
44	214	125	125	75	211	175
93	130	-	-	-	-	-
94	253	228	169	449	449	321
95	91	80	116	122	122	113
102	-	-	-	127	127	122

TABLE AII.174

MEAN DAILY FECAL WET WEIGHT: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	154	68	42	42	129	197
46	138	73	21	21	125	251
47	91	73	20	20	71	91
48	167	150	44	44	128	271
49	119	86	15	15	219	156
50	142	102	1	1	180	157
51	152	61	46	46	151	102
52	198	98	40	40	98	285
53	94	105	34	42	173	118
54	124	137	47	36	268	144
55	67	103	26	26	182	118
56	87	75	110	110	170	232
57	77	78	22	22	37	67
58	87	112	143	191	191	204
59	-	-	89	99	154	137
60	102	116	64	64	73	106
61	155	121	59	81	235	159
62	160	92	58	58	105	151
63	102	68	18	49	242	182
64	133	142	36	36	133	209
65	197	188	103	81	178	162
66	157	148	102	71	195	171
96	103	134	121	128	128	120
97	55	80	93	102	102	110
98	146	177	87	102	102	197

TABLE AII.175

MEAN DAILY FECAL WET WEIGHT: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	186	60	0	0	203	244
68	127	36	57	173	173	180
69	159	118	23	23	231	191
70	135	128	16	16	122	254
71	133	72	17	17	140	203
72	119	67	14	14	193	223
73	101	131	85	85	149	-
74	84	74	37	37	125	250
75	58	76	43	43	89	122
76	136	66	55	55	135	178
77	134	83	-	-	-	-
78	121	163	55	47	186	310

TABLE AII.175 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	158	87	61	61	118	170
80	144	50	34	34	120	138
81	166	103	43	61	214	154
82	111	41	46	-	-	98
83	159	85	48	96	310	201
84	188	59	70	70	136	197
85	142	149	119	70	258	286
86	280	169	116	116	145	182
87	157	161	256	-	-	110
88	111	151	85	-	-	-
99	148	128	170	165	165	119
100	60	97	103	110	110	154
101	191	210	144	171	171	88

TABLE AII.176

MEAN DAILY FECAL NITROGEN: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	2.0	2.1	0.5	0	1.8	2.6
2	0.9	0.9	---	---	---	2.8
3	2.4	1.9	0.4	0	1.7	3.6
4	1.9	1.4	0.4	1.1	3.6	2.9
5	2.3	2.9	0	---	---	3.6
6	2.8	1.5	0.4	0.4	2.1	2.3
7	2.8	2.9	0.7	0.7	2.1	2.8
8	4.6	2.6	0.8	1.3	2.6	2.1
9	3.0	1.9	1.1	1.7	2.4	1.9
10	1.4	2.1	0.5	0.5	2.7	2.2
11	1.1	2.3	0.8	0.8	1.9	3.1
12	2.2	1.2	2.0	2.0	3.1	2.7
13	1.6	2.0	0.5	---	---	---
14	5.8	2.9	2.4	2.4	2.5	3.2
15	2.9	3.7	0.5	0.5	---	---
16	3.3	2.1	0.7	---	---	---
17	1.3	3.6	1.7	1.7	3.8	1.8
18	1.5	2.2	0.9	0.9	1.9	2.2
19	2.3	1.7	1.4	1.5	4.4	2.0
20	2.3	2.3	1.8	---	---	---
21	2.0	1.9	1.8	2.5	5.4	1.9
22	2.2	1.7	1.2	1.3	3.7	1.6
90	4.4	3.4	2.3	2.5	2.5	2.4
91	2.9	1.7	1.0	1.9	1.9	1.3
92	2.0	2.2	1.2	1.3	1.3	1.5

TABLE AII.177

MEAN DAILY FECAL NITROGEN: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	2.9	1.8	0.3	0.3	4.3	1.7
24	2.1	1.4	0.6	0.6	0.9	---
25	3.0	1.9	0.3	1.0	3.6	2.5
26	3.6	1.6	0.4	0.4	1.9	2.1
27	4.5	1.8	0.8	0.8	2.3	2.5
28	2.2	1.8	1.6	1.6	3.0	2.3
29	3.7	2.1	0.7	0.7	2.0	1.7
30	---	2.0	0.7	0.7	2.5	1.3
31	2.2	1.9	1.4	1.5	1.5	1.4
32	2.5	1.9	0.6	0.5	2.1	1.4
33	3.2	2.3	1.2	1.5	3.0	2.2
34	2.5	2.8	0.9	0.7	1.4	2.5
35	2.2	1.1	0.8	0.8	1.8	2.1
36	1.7	2.7	0.4	0.4	1.5	2.9
37	1.8	1.2	1.1	1.5	3.1	2.0
38	1.6	1.1	0.6	0.2	1.1	2.0
39	1.6	1.7	0.7	0.3	1.3	---
40	1.3	1.8	1.5	5.0	5.0	1.6
41	2.3	3.4	---	---	---	2.3
42	4.7	3.3	2.1	2.1	2.9	1.5
43	1.6	1.7	3.6	1.4	3.7	2.1
44	3.2	2.5	2.5	1.9	5.4	2.3
93	1.3	---	---	---	---	---
94	3.7	2.8	2.4	5.0	5.0	2.1
95	2.3	1.7	3.0	2.3	2.3	1.9
102	---	---	---	1.6	1.6	0.7

TABLE AII.178

MEAN DAILY FECAL NITROGEN: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	3.6	1.7	0.8	0.8	2.8	2.0
46	4.2	1.1	0.2	0.2	2.6	2.7
47	1.6	1.8	0.6	0.6	2.1	1.6
48	2.9	3.1	1.2	1.2	2.4	3.3
49	1.7	2.2	0.5	0.5	2.6	1.9
50	3.7	2.1	0.0	0.0	4.2	2.2
51	2.9	3.0	1.0	1.0	3.3	1.9
52	3.8	5.8	1.0	1.0	2.2	2.3
53	2.2	2.2	0.4	1.0	4.1	2.2
54	3.7	2.7	0.5	0.5	3.6	2.3
55	1.3	2.1	0.6	0.6	3.1	1.8
56	1.0	1.8	1.8	1.8	3.4	1.5

TABLE AII.178 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	2.1	1.4	0.5	0.5	0.9	1.7
58	3.2	1.6	1.5	2.3	2.3	1.7
59	---	---	0.9	1.7	2.6	1.6
60	2.3	1.4	0.6	0.6	1.5	1.5
61	2.6	2.7	1.2	1.4	4.1	2.0
62	3.8	1.8	1.1	1.1	2.0	1.7
63	2.5	1.4	0.4	1.2	6.0	2.2
64	3.0	3.6	0.7	0.7	2.2	2.5
65	6.2	3.2	1.9	1.5	3.3	2.5
66	5.1	1.7	1.8	1.1	3.1	1.9
96	2.2	2.7	2.3	2.3	2.3	2.2
97	1.2	1.3	1.4	1.8	1.8	1.9
98	2.5	2.5	1.5	1.2	1.2	1.6

TABLE AII.179

MEAN DAILY FECAL NITROGEN: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	2.7	1.1	0.0	0.0	2.6	1.8
68	2.7	0.5	0.8	3.0	3.0	3.0
69	4.3	2.2	0.8	0.8	3.0	1.8
70	2.4	2.3	1.9	1.9	2.2	2.2
71	2.0	1.2	0.5	0.5	2.6	2.6
72	1.7	1.4	0.2	0.2	4.4	2.6
73	3.8	2.3	0.9	0.9	1.5	---
74	3.8	1.5	0.6	0.6	2.1	2.5
75	1.8	2.1	1.3	1.3	1.9	2.4
76	2.8	0.7	0.9	0.9	1.9	2.1
77	2.1	1.3	---	---	---	---
78	2.0	2.1	1.0	2.4	2.7	4.3
79	1.7	1.2	1.0	1.0	6.9	2.4
80	2.5	1.3	0.6	0.6	3.1	2.2
81	2.5	1.6	0.7	0.9	3.3	1.8
82	2.3	0.8	0.8	---	---	2.7
83	2.2	1.4	0.8	1.1	3.0	1.3
84	2.3	1.0	0.9	0.9	1.9	2.5
85	2.5	2.1	1.6	1.0	3.7	2.6
86	3.9	2.7	1.7	1.7	2.0	1.4
87	4.6	1.3	3.3	---	---	2.0
88	2.6	2.7	1.2	---	---	---
99	1.9	2.1	2.0	2.4	2.4	1.5
100	1.7	1.4	1.6	1.4	1.4	2.1
101	1.7	2.9	2.2	2.2	2.2	2.0

TABLE AII.180

MEAN DAILY FECAL FAT: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	2.4	4.8	1.1	4.9	6.5
2	2.4	1.4	---	---	8.3
3	2.9	2.3	0.7	2.0	3.8
4	2.8	3.4	1.5	5.6	6.1
5	2.5	2.6	0.0	---	8.7
6	2.6	2.6	1.3	3.5	4.7
7	2.7	5.7	0.7	3.5	6.6
8	5.6	3.8	0.7	3.8	2.8
9	1.4	3.4	1.7	4.1	3.8
10	3.0	3.0	1.2	---	5.3
11	5.9	5.4	1.1	3.2	5.9
12	6.2	1.7	2.4	5.5	7.8
13	1.2	2.6	3.5	---	---
14	11.0	5.6	3.5	3.4	4.9
15	4.4	5.8	1.6	---	---
16	1.8	2.6	2.3	---	---
17	1.9	6.3	2.1	7.4	4.5
18	2.3	2.4	1.1	2.6	4.6
19	2.1	1.4	3.0	9.3	4.2
20	3.8	2.0	3.2	---	---
21	3.6	2.0	2.1	6.3	3.8
22	4.9	2.2	3.0	5.6	3.4
90	10.7	7.5	3.8	4.6	6.1
91	20.6	15.2	5.7	14.0	9.5
92	4.1	5.0	2.3	2.6	3.9

TABLE AII.181

MEAN DAILY FECAL FAT: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	4.1	2.3	0.6	3.5	6.3
24	2.1	1.1	0.4	1.3	---
25	6.1	3.5	0.2	7.6	5.4
26	8.5	2.8	0.3	4.5	5.1
27	4.5	1.6	0.8	2.7	4.7
28	3.6	1.5	5.2	5.5	3.9
29	2.9	1.5	0.6	2.5	1.5
30	(2.1)	2.1	0.5	4.5	1.9
31	2.4	1.3	3.5	4.6	2.8
32	5.5	2.9	0.5	3.8	2.7
33	3.5	1.7	2.9	2.7	3.7
34	4.3	2.1	2.5	2.4	2.8

TABLE AII.181 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
35	3.5	1.3	2.2	3.9	3.4
36	3.2	3.1	0.6	3.4	5.0
37	1.5	0.6	2.5	3.2	2.9
38	3.5	1.1	1.8	3.9	4.6
39	2.1	1.9	1.2	1.1	---
40	3.4	4.2	2.7	7.0	4.9
41	3.7	2.0	---	---	3.2
42	4.0	3.2	5.7	3.7	4.1
43	2.1	1.4	5.7	4.4	3.0
44	4.3	2.2	2.8	6.7	3.2
93	4.3	---	---	---	---
94	9.9	5.5	5.5	9.7	5.8
95	5.1	2.4	3.4	5.0	3.1
102	---	---	---	5.6	2.8

TABLE AII.182

MEAN DAILY FECAL FAT: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	4.5	1.2	1.2	4.3	4.8
46	7.0	1.4	0.3	4.5	5.9
47	1.6	2.5	1.0	3.8	3.6
48	6.5	3.4	1.8	4.7	5.4
49	2.9	2.5	0.7	3.5	2.8
50	6.7	3.5	0.1	6.5	5.4
51	5.0	7.9	1.1	5.4	3.3
52	1.7	6.1	0.3	2.7	4.6
53	2.3	1.3	0.6	4.3	2.9
54	4.7	4.5	0.2	7.1	3.1
55	2.1	2.4	0.4	4.0	2.7
56	3.4	4.5	5.9	4.2	2.7
57	2.7	1.2	1.1	1.0	2.6
58	7.4	2.3	1.9	2.6	3.3
59	(5.1)	(3.2)	3.5	5.6	4.1
60	6.3	1.8	2.7	2.7	3.3
61	(5.1)	2.3	1.3	5.3	3.5
62	7.2	2.1	1.3	2.5	2.2
63	9.3	3.1	0.9	9.7	5.0
64	7.0	4.1	1.1	3.9	4.0
65	(5.1)	5.9	3.4	4.0	4.3
66	7.7	3.5	1.8	3.8	3.5
96	4.7	6.7	5.3	4.1	6.5
97	2.0	3.2	3.0	4.2	6.0
98	1.9	4.0	1.8	3.9	6.2

TABLE AII.183

MEAN DAILY FECAL FAT: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	8.5	1.7	0.0	5.2	3.2
68	9.5	4.3	1.6	4.3	13.8
69	8.8	2.5	0.6	5.5	3.5
70	3.7	3.4	3.2	3.0	4.0
71	3.2	1.7	0.5	5.3	6.4
72	3.5	2.9	0.4	7.4	5.1
73	3.9	2.3	1.2	0.9	---
74	12.3	3.1	0.1	3.5	6.2
75	3.5	4.1	2.0	3.2	6.9
76	4.5	2.4	1.6	3.4	6.8
77	2.4	1.8	---	---	---
78	1.8	3.5	1.9	2.7	8.1
79	4.3	2.6	3.5	10.7	3.6
80	4.1	1.8	1.5	5.1	3.4
81	2.9	1.5	1.9	4.5	2.3
82	2.6	0.8	0.9	---	7.0
83	1.4	2.3	0.6	5.3	1.8
84	6.9	1.8	1.6	4.9	4.6
85	4.0	3.7	2.0	6.0	4.5
86	5.2	4.3	1.4	2.2	2.3
87	4.4	1.4	1.9	---	3.7
88	1.5	5.1	1.0	---	---
99	1.8	1.3	2.6	4.6	2.6
100	1.0	2.4	2.0	3.6	5.0
101	1.6	---	6.6	13.2	5.0

TABLE AII.184

MEAN DAILY FECAL SODIUM: FLIGHT 1
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	1.0	0.8	0.9	0.0	1.7	2.5
2	1.1	1.4	---	---	---	1.7
3	1.2	1.1	1.1	0.0	1.1	1.0
4	0.8	0.8	0.8	1.0	3.1	1.4
5	1.3	2.8	0.0	---	---	4.2
6	1.4	0.8	0.9	0.9	4.3	1.9
7	1.9	8.1	2.7	2.7	7.2	3.0
8	2.3	7.7	2.0	1.4	2.8	1.2
9	0.9	1.7	1.5	1.2	1.8	1.5
10	1.5	2.2	1.7	1.7	1.5	2.0
11	1.5	1.7	1.5	1.5	1.6	1.2
12	1.8	1.5	2.1	2.1	2.2	1.4

TABLE AII.184 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	2.5	2.9	2.1	---	---	---
14	3.7	6.4	2.9	2.9	1.2	4.4
15	2.3	6.5	1.5	1.5	---	---
16	2.1	3.2	4.3	---	---	---
17	1.0	5.8	3.2	3.2	2.9	1.2
18	1.5	2.7	0.9	0.9	1.1	1.5
19	1.8	2.1	1.6	2.3	5.9	1.8
20	1.0	2.5	2.1	---	---	---
21	1.6	2.1	1.7	2.1	4.5	1.0
22	1.1	1.5	1.2	0.8	2.2	1.0
90	2.3	2.5	3.8	4.2	4.2	3.8
91	1.5	1.6	1.3	5.9	5.9	0.9
92	1.0	1.2	1.2	2.4	2.4	2.2

TABLE AII.185

MEAN DAILY FECAL SODIUM: FLIGHT 2
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	1.1	2.7	0.6	0.6	3.8	1.8
24	2.4	1.6	0.9	0.9	0.7	---
25	3.3	2.1	0.7	1.4	4.7	2.1
26	1.1	1.5	0.7	0.7	1.1	1.3
27	1.7	1.8	2.0	2.0	5.9	1.2
28	0.8	2.3	1.5	1.5	2.2	1.0
29	1.1	2.1	1.6	1.6	1.3	0.9
30	---	2.3	4.6	4.6	2.2	1.2
31	1.7	2.2	2.3	0.8	0.8	0.6
32	1.1	2.3	0.9	0.4	1.6	0.9
33	3.8	5.3	2.0	1.5	2.9	2.0
34	2.1	2.5	1.5	1.1	2.2	2.0
35	2.0	0.9	2.5	2.5	1.3	1.5
36	2.2	3.1	1.9	1.9	1.6	1.6
37	0.8	0.7	2.0	0.9	1.7	0.6
38	1.5	0.7	1.6	0.5	2.3	1.0
39	2.0	1.5	3.8	1.0	5.1	---
40	1.0	2.9	2.1	3.1	3.1	1.6
41	1.7	3.9	---	---	---	3.6
42	2.2	1.7	2.5	2.5	2.4	1.0
43	1.3	1.2	2.3	1.3	3.4	1.5
44	2.3	2.0	4.6	1.8	4.9	1.0
93	1.3	---	---	---	---	---
94	6.2	5.2	2.8	5.6	5.6	4.5
95	1.3	0.9	3.3	5.3	5.3	1.4
102	---	---	---	1.2	1.2	1.5

TABLE AII.186

MEAN DAILY FECAL SODIUM: FLIGHT 3
(mEq/day)

Subject Code No.	P I	P II	EXP I	REC II	REC I	REC II
45	2.7	1.9	1.5	1.5	3.3	2.0
46	3.1	1.5	1.5	1.5	3.7	3.4
47	1.4	1.0	1.1	1.1	4.0	1.1
48	2.0	2.9	1.1	1.1	7.9	1.6
49	1.0	1.6	0.6	0.4	5.8	1.0
50	1.1	1.9	0.0	0.0	5.8	1.0
51	1.4	1.5	1.5	1.5	3.4	1.1
52	2.5	4.7	4.1	4.1	3.5	4.0
53	1.4	1.3	1.5	1.7	7.1	1.2
54	2.6	1.6	1.5	0.4	2.8	1.0
55	1.0	1.3	1.5	1.5	1.7	1.3
56	1.2	0.9	1.7	1.7	1.8	1.0
57	1.1	1.1	0.9	0.9	1.0	0.9
58	1.7	1.1	2.5	2.6	2.6	1.5
59	---	---	2.7	1.0	1.6	0.6
60	1.3	2.8	2.1	2.1	1.5	0.9
61	0.8	0.9	1.1	0.5	1.9	1.0
62	1.7	1.2	1.6	1.6	2.3	1.2
63	1.3	0.9	0.9	0.7	3.8	1.2
64	1.0	1.2	1.1	1.1	2.2	0.6
65	3.5	2.4	1.9	1.4	3.2	0.6
66	1.4	1.0	1.3	0.9	2.4	0.7
96	1.3	1.7	1.7	2.4	2.4	1.4
97	0.8	1.2	2.2	1.8	1.8	1.4
98	1.4	2.4	1.2	3.1	3.1	1.4

TABLE AII.187

MEAN DAILY FECAL SODIUM: FLIGHT 4
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	1.4	0.7	0.0	0.0	5.8	1.5
68	1.2	0.6	2.1	2.4	2.4	10.3
69	3.1	1.6	1.1	1.1	5.3	1.2
70	1.4	1.3	1.9	1.9	2.3	1.6
71	1.1	0.7	0.8	0.8	2.4	1.6
72	1.0	1.0	0.2	0.2	3.6	2.0
73	1.4	3.9	3.5	3.5	10.9	---
74	1.6	1.2	1.5	1.5	2.9	3.0
75	1.0	1.2	1.2	1.2	1.6	1.4
76	1.2	0.8	1.1	1.1	3.6	1.5
77	1.1	1.6	---	---	---	---
78	1.2	1.3	1.5	1.3	5.3	3.9

TABLE AII.187 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	1.3	1.2	1.5	1.5	6.8	1.5
80	1.4	0.9	1.1	1.1	2.5	0.9
81	2.0	1.2	1.7	0.7	2.4	1.3
82	1.6	1.1	2.4	---	---	3.2
83	1.1	1.0	4.2	1.6	4.7	1.0
84	1.2	0.8	2.0	2.0	2.4	1.2
85	1.2	2.4	5.6	2.0	7.1	3.1
86	2.4	2.2	3.6	3.6	2.4	1.2
87	1.7	1.0	7.5	---	---	2.2
88	1.0	1.7	3.1	---	---	---
99	1.0	1.6	1.8	3.8	3.8	1.4
100	0.8	1.0	1.2	1.4	1.4	1.6
101	0.9	1.9	1.2	2.3	2.3	0.9

TABLE AII.188

MEAN DAILY FECAL POTASSIUM: FLIGHT 1
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	7.3	9.6	3.4	0.0	10.7	10.5
2	3.7	4.0	---	---	---	15.9
3	9.1	8.3	2.4	0.0	9.8	16.0
4	7.8	8.7	3.3	6.5	21.3	8.2
5	9.9	15.4	0.0	---	---	18.8
6	12.4	9.4	2.8	2.8	13.8	15.0
7	15.4	37.6	3.6	3.6	18.0	25.5
8	16.0	28.4	5.3	8.8	18.2	13.5
9	9.5	8.5	5.7	11.9	17.9	15.2
10	6.0	7.1	5.9	5.9	11.1	10.3
11	8.3	6.6	3.8	3.8	7.4	9.8
12	13.3	4.2	7.1	7.1	15.9	14.1
13	4.5	7.8	5.6	---	---	---
14	33.0	17.7	20.2	20.2	15.6	17.3
15	15.7	26.1	3.0	3.0	---	---
16	13.0	9.5	5.8	---	---	---
17	7.6	76.2	8.9	8.9	24.2	9.2
18	5.5	9.5	4.1	4.1	13.0	8.5
19	8.7	6.6	5.2	7.0	21.0	6.8
20	7.6	8.4	8.5	---	---	---
21	10.6	8.7	7.5	14.6	31.1	11.5
22	8.6	6.9	8.5	6.0	16.7	6.8
90	38.3	30.2	18.9	15.8	15.8	17.7
91	18.7	15.3	9.1	11.1	11.1	8.7
92	10.8	14.8	7.8	46.2	46.2	11.2

TABLE AII.189

MEAN DAILY FECAL POTASSIUM: FLIGHT 2
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	9.8	6.2	1.8	1.8	28.6	11.1
24	9.3	4.7	2.9	2.9	12.2	---
25	12.2	6.1	1.4	6.5	22.4	10.5
26	10.8	6.6	1.6	1.6	13.0	12.1
27	16.0	6.1	4.1	4.1	13.7	18.5
28	9.3	9.3	11.4	11.4	18.9	10.6
29	7.0	7.4	3.5	3.5	12.1	9.1
30	---	5.9	4.2	4.2	11.0	6.0
31	10.3	9.7	8.8	8.5	8.5	7.9
32	14.0	12.5	4.0	3.6	15.5	10.5
33	14.3	12.5	6.5	8.1	15.7	14.0
34	10.6	11.8	4.6	6.8	13.3	12.5
35	9.6	4.6	6.0	6.0	10.7	10.6
36	7.2	6.4	1.7	1.7	8.2	13.6
37	7.9	3.4	6.2	7.4	15.0	8.8
38	8.1	4.2	2.4	1.0	4.9	9.7
39	11.6	8.2	6.2	1.7	8.1	---
40	5.5	9.5	7.4	17.8	17.8	9.7
41	8.5	12.6	---	---	---	15.4
42	17.7	11.7	10.2	10.2	14.2	9.0
43	10.3	8.2	18.5	6.7	18.1	9.9
44	13.9	11.3	14.0	9.1	25.7	8.0
93	13.5	---	---	---	---	---
94	16.4	16.6	12.4	21.3	21.3	10.8
95	9.7	9.1	19.2	13.8	13.8	13.1
102	---	---	---	14.1	14.1	7.2

TABLE AII.190

MEAN DAILY FECAL POTASSIUM: FLIGHT 3
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	13.6	6.2	5.5	5.5	16.3	11.8
46	19.5	12.1	1.6	1.6	19.7	12.5
47	7.3	7.6	3.5	3.5	8.5	10.1
48	10.8	10.3	5.1	5.1	12.3	7.1
49	11.1	7.9	2.6	2.1	31.0	10.1
50	17.2	8.3	0.2	0.2	23.8	11.0
51	9.3	10.2	4.0	4.0	12.6	8.2
52	17.5	32.2	2.4	2.4	10.0	17.1
53	10.0	9.8	3.5	4.8	19.7	12.8
54	17.7	12.7	5.1	4.5	33.3	10.3
55	6.4	7.4	2.4	2.4	13.6	7.1

TABLE AII.190 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
56	4.9	5.5	8.7	8.7	13.1	8.0
57	5.4	6.2	1.6	1.6	3.4	4.8
58	12.7	7.5	10.3	18.3	18.3	12.1
59	---	---	7.1	7.7	11.9	6.4
60	9.1	7.5	4.1	4.1	8.1	6.4
61	12.0	8.5	5.6	8.6	25.0	15.0
62	10.8	6.3	3.6	3.6	9.4	4.4
63	9.2	5.3	1.2	5.4	27.1	6.2
64	10.0	13.2	2.4	2.4	8.9	9.0
65	17.5	16.6	12.3	8.5	18.7	8.7
66	21.0	11.8	14.2	8.1	22.1	12.7
96	10.2	12.1	11.7	9.6	9.6	7.7
97	8.7	9.2	8.9	13.1	13.1	13.0
98	9.7	12.3	6.6	6.9	6.9	9.5

TABLE AII.191

MEAN DAILY FECAL POTASSIUM: FLIGHT 4
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	9.5	4.9	0.0	0.0	17.0	11.3
68	11.5	5.9	5.8	20.3	20.3	50.8
69	22.8	10.3	4.2	4.2	27.7	12.0
70	10.3	12.7	10.2	10.2	15.8	11.4
71	6.3	5.2	4.0	4.0	12.8	8.1
72	8.5	6.3	1.2	1.2	26.0	10.6
73	12.3	10.5	6.0	6.0	6.7	---
74	11.2	4.7	3.5	3.5	7.4	10.9
75	4.4	10.1	4.5	4.5	9.9	9.2
76	11.6	5.7	4.2	4.2	9.1	7.8
77	7.6	7.5	---	---	---	---
78	12.0	9.2	5.8	7.3	29.1	17.3
79	11.2	8.5	10.8	10.8	17.5	11.5
80	10.1	4.5	3.5	3.5	14.0	7.4
81	13.8	9.2	8.8	3.7	13.0	6.1
82	7.6	3.9	3.9	---	---	17.2
83	7.8	6.4	4.3	5.2	14.9	4.5
84	9.1	6.1	7.4	7.4	10.3	9.2
85	8.6	11.7	10.6	5.9	21.7	13.5
86	7.0	13.1	12.3	12.3	14.3	5.3
87	24.9	7.4	27.7	---	---	10.1
88	7.2	7.7	8.2	---	---	---
99	11.5	12.6	12.0	14.9	14.9	9.5
100	6.1	7.8	7.9	11.4	11.4	12.2
101	14.1	21.7	14.0	18.2	18.2	11.9

TABLE AII.192

MEAN DAILY FECAL CALCIUM: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	1.19	1.16	0.11	0.00	0.54	0.95
2	0.44	0.65	----	----	----	2.13
3	1.29	1.42	0.09	0.00	0.46	1.02
4	0.83	1.34	0.04	0.38	1.23	0.72
5	1.18	1.69	0.00	----	----	4.16
6	1.25	1.55	0.17	0.17	0.84	0.89
7	0.87	2.22	0.16	0.16	0.83	1.06
8	1.69	1.51	0.00	0.37	0.75	0.73
9	1.27	0.65	0.26	0.49	0.74	0.49
10	0.27	0.36	0.52	0.52	0.55	0.69
11	0.60	0.44	0.09	0.09	0.58	0.85
12	0.94	0.49	0.53	0.53	1.28	0.93
13	0.30	1.07	0.05	----	----	----
14	2.42	1.32	1.13	1.13	0.85	0.98
15	1.21	1.78	0.32	0.32	----	----
16	0.40	0.24	0.37	----	----	----
17	0.68	4.14	0.37	0.37	1.26	0.40
18	0.62	0.57	0.46	0.46	0.38	0.48
19	0.45	0.40	0.43	0.40	1.21	0.66
20	0.43	0.60	0.67	----	----	----
21	0.77	0.48	0.22	0.32	0.69	0.64
22	1.13	0.56	0.40	0.31	0.86	0.43
90	1.84	1.78	1.36	1.62	1.62	1.53
91	3.03	3.32	1.63	2.72	2.72	2.09
92	1.30	1.44	0.83	0.86	0.86	0.96

TABLE AII.193

MEAN DAILY FECAL CALCIUM: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.86	0.44	0.23	0.23	1.14	0.58
24	0.68	0.29	0.07	0.07	0.18	----
25	1.32	0.58	0.28	0.30	1.05	0.72
26	1.21	0.42	0.23	0.23	0.72	0.39
27	1.36	0.46	0.07	0.07	0.51	0.74
28	0.84	0.46	0.51	0.51	1.02	0.54
29	0.90	0.42	0.06	0.06	0.68	0.46
30	----	0.43	0.04	0.04	0.67	0.28
31	0.51	0.42	0.46	0.98	0.98	1.06
32	0.92	0.42	0.07	0.15	0.64	0.55
33	0.20	0.54	0.05	0.30	0.58	0.53
34	0.41	0.27	0.06	0.11	0.21	0.49

TABLE AII.193 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	0.54	0.37	0.10	0.10	0.52	0.72
36	0.51	0.56	0.05	0.05	0.27	0.77
37	0.24	0.38	0.10	0.40	0.81	0.68
38	0.36	0.09	0.17	0.05	0.25	0.48
39	0.27	0.21	0.12	0.08	0.40	----
40	0.57	0.74	0.19	0.95	0.95	0.63
41	0.45	0.70	----	----	----	1.13
42	0.83	0.64	0.31	0.31	0.75	0.61
43	1.15	0.41	0.52	0.33	0.84	0.43
44	0.99	0.36	0.12	0.31	0.88	0.37
93	1.20	----	----	----	----	----
94	1.72	1.53	1.36	2.40	2.40	1.04
95	0.91	1.04	1.18	1.21	1.21	1.19
102	----	----	----	1.05	1.05	0.72

TABLE AII.194

MEAN DAILY FECAL CALCIUM: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.90	0.36	0.17	0.17	0.47	0.45
46	1.47	0.34	0.06	0.06	0.78	0.58
47	0.75	0.75	0.09	0.09	0.49	0.55
48	1.05	0.66	0.39	0.39	0.64	0.71
49	0.77	0.50	0.13	0.13	1.96	0.52
50	0.96	0.44	0.00	0.00	0.89	0.48
51	1.28	0.86	0.21	0.21	1.04	0.47
52	1.07	1.53	0.08	0.08	0.36	0.45
53	0.36	0.46	0.08	0.25	1.05	0.44
54	0.39	0.53	0.14	0.16	1.22	0.48
55	0.35	0.64	0.06	0.06	0.80	0.56
56	0.32	0.71	0.65	0.65	0.90	0.72
57	0.35	0.44	0.08	0.08	0.19	0.41
58	0.98	0.76	0.82	1.04	1.04	1.40
59	----	----	0.55	0.68	1.07	0.56
60	0.79	0.59	0.20	0.20	0.51	0.60
61	0.45	0.43	0.08	0.26	0.74	0.42
62	1.48	0.33	0.06	0.06	0.64	1.06
63	0.95	0.58	0.04	0.38	1.93	1.44
64	0.41	0.78	0.02	0.02	0.75	0.83
65	1.61	0.81	0.19	0.38	0.83	0.69
66	1.66	0.69	0.27	0.36	1.00	1.12
96	0.99	1.53	1.38	1.11	1.11	1.35
97	0.66	1.50	1.04	1.03	1.03	1.26
98	1.43	1.46	0.90	0.75	0.75	1.42

TABLE AII.195

MEAN DAILY FECAL CALCIUM: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.76	0.44	0.00	0.00	0.61	1.00
68	1.02	0.30	0.17	0.79	0.79	3.04
69	1.29	0.52	0.15	0.15	0.70	0.77
70	1.08	1.00	0.73	0.73	0.78	1.10
71	0.82	0.46	0.10	0.10	0.74	1.06
72	0.72	0.41	0.06	0.06	1.33	0.97
73	1.00	0.69	0.20	0.20	0.23	----
74	1.31	0.29	0.12	0.12	0.59	0.60
75	0.73	0.38	0.26	0.26	0.30	0.56
76	0.87	0.40	0.14	0.14	0.36	0.53
77	0.59	0.26	----	----	----	----
78	0.63	0.30	0.20	0.41	1.62	0.93
79	1.07	0.42	0.48	0.48	0.67	0.56
80	0.81	0.35	0.26	0.26	0.74	0.65
81	1.27	0.66	0.45	0.33	1.18	0.62
82	1.07	0.26	0.23	----	----	2.33
83	0.64	0.40	0.10	0.20	0.56	0.46
84	0.98	0.29	0.20	0.20	0.70	0.74
85	0.70	0.50	0.21	0.20	0.74	0.59
86	1.35	0.46	0.24	0.24	0.49	0.55
87	1.36	0.18	0.70	----	----	1.44
88	0.32	0.74	0.36	----	----	----
99	1.04	0.80	0.57	1.03	1.03	0.63
100	1.01	0.61	0.68	0.77	0.77	1.02
101	1.58	2.21	1.54	2.06	2.06	0.93

TABLE AII.196

MEAN DAILY FECAL PHOSPHORUS: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.49	0.41	0.11	0.00	0.44	0.49
2	0.21	0.22	----	----	----	1.05
3	0.68	0.33	0.10	0.00	0.46	0.72
4	0.33	0.37	0.12	0.26	0.83	0.98
5	0.73	1.14	0.00	----	----	2.20
6	0.86	0.29	0.16	0.15	0.75	0.76
7	0.58	1.49	0.27	0.27	0.47	0.52
8	0.96	0.51	0.11	0.26	0.53	0.40
9	0.71	0.37	0.19	0.36	0.54	0.35
10	0.22	0.22	0.21	0.21	0.42	0.43
11	0.38	0.32	0.10	0.10	0.38	0.53
12	0.70	0.23	0.20	0.20	0.57	0.54

TABLE AII.196 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	0.47	0.82	0.11	----	----	----
14	1.41	1.00	0.85	0.85	0.67	0.93
15	0.99	1.36	0.11	0.11	----	----
16	0.62	0.30	0.08	----	----	----
17	0.39	2.91	0.22	0.22	0.81	0.35
18	0.35	0.37	0.19	0.19	0.32	0.35
19	0.56	0.29	0.17	0.28	0.84	0.45
20	0.54	0.50	0.32	----	----	----
21	0.51	0.38	0.17	0.38	0.82	0.47
22	0.54	0.31	0.20	0.21	0.60	0.33
90	1.21	1.55	1.10	1.23	1.23	1.02
91	1.26	1.34	0.70	1.01	1.01	0.72
92	0.81	0.76	0.43	0.46	0.46	0.50

TABLE AII.197

MEAN DAILY FECAL PHOSPHORUS: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.51	0.28	0.08	0.08	1.03	0.37
24	0.44	0.21	0.11	0.11	0.36	----
25	0.68	0.35	0.06	0.22	0.76	0.37
26	0.63	0.21	0.08	0.45	0.45	0.27
27	0.70	0.31	0.19	0.19	0.49	0.54
28	0.45	0.32	0.71	0.71	0.68	0.40
29	0.90	0.33	0.13	0.13	0.54	0.42
30	----	0.32	0.12	0.12	0.46	0.27
31	0.37	0.32	0.30	0.48	0.48	0.50
32	0.50	0.25	0.09	0.10	0.44	0.34
33	0.54	0.35	0.11	0.28	0.55	0.39
34	0.38	0.29	0.08	0.15	0.30	0.44
35	0.45	0.34	0.11	0.11	0.38	0.42
36	0.36	0.40	0.06	0.06	0.24	0.45
37	0.36	0.20	0.29	0.28	0.57	0.40
38	0.25	0.16	0.11	0.04	0.21	0.33
39	0.28	0.20	0.15	0.04	0.22	----
40	0.33	0.40	0.21	0.77	0.77	0.39
41	0.34	0.46	----	----	----	0.84
42	0.91	0.47	0.31	0.31	0.56	0.48
43	0.58	0.31	0.42	0.23	0.62	0.38
44	0.60	0.33	0.32	0.28	0.80	0.34
93	0.40	----	----	----	----	----
94	0.92	0.81	0.63	1.26	1.26	0.53
95	0.50	0.54	0.83	0.76	0.76	0.59
102	----	----	----	0.64	0.64	0.29

TABLE AII.198

MEAN DAILY FECAL PHOSPHORUS: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.63	0.22	0.14	0.14	0.43	0.30
46	1.01	0.29	0.06	0.06	0.67	0.52
47	0.39	0.39	0.12	0.12	0.40	0.37
48	0.53	0.37	0.19	0.19	0.45	0.40
49	0.47	0.29	0.08	0.08	0.34	0.32
50	0.77	0.24	0.00	0.00	0.82	0.28
51	0.71	0.58	0.20	0.20	0.60	0.28
52	0.77	1.38	0.09	0.09	0.43	0.40
53	0.40	0.29	0.05	0.19	0.79	0.52
54	0.70	0.36	0.06	0.17	1.24	0.40
55	0.38	0.35	0.11	0.11	0.47	0.31
56	0.40	0.39	0.30	0.30	0.63	0.41
57	0.33	0.27	0.08	0.08	0.15	0.31
58	0.83	0.49	0.36	0.68	0.68	0.89
59	----	----	0.26	0.32	0.50	0.38
60	0.36	0.41	0.13	0.13	0.31	0.36
61	0.56	0.31	0.13	0.25	0.72	0.32
62	0.84	0.26	0.13	0.13	0.31	0.23
63	0.75	0.31	0.08	0.22	1.12	0.39
64	0.60	0.50	0.11	0.11	0.48	0.43
65	0.88	0.50	0.23	0.26	0.56	0.39
66	0.86	0.45	0.20	0.18	0.51	0.40
96	0.59	0.83	0.87	0.67	0.67	0.63
97	0.44	0.61	0.51	0.57	0.57	0.58
98	0.59	0.77	0.42	0.37	0.37	0.65

TABLE AII.199

MEAN DAILY FECAL PHOSPHORUS: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.40	0.23	0.00	0.00	0.45	0.42
68	0.59	0.19	0.16	0.68	0.68	0.68
69	0.83	0.36	0.13	0.13	0.64	0.33
70	0.50	0.60	0.44	0.44	0.64	0.48
71	0.43	0.34	0.11	0.11	0.50	0.41
72	0.34	0.23	0.03	0.03	0.67	0.41
73	0.65	0.44	0.15	0.15	0.18	----
74	0.76	0.20	0.06	0.06	0.33	0.39
75	0.29	0.32	0.19	0.19	0.23	0.44
76	0.56	0.21	0.09	0.09	0.25	0.42
77	0.38	0.25	----	----	----	----
78	0.41	0.29	0.09	0.30	0.41	0.35

TABLE AII.199 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	0.42	0.32	0.23	0.23	0.44	0.47
80	0.50	0.20	0.16	0.16	0.57	0.46
81	0.78	0.50	0.20	0.20	0.71	0.41
82	0.50	0.20	0.15	----	----	1.14
83	0.35	0.22	0.08	0.16	0.46	0.25
84	0.47	0.20	0.20	0.20	0.31	0.43
85	0.37	0.41	0.17	0.19	0.69	0.47
86	0.78	0.47	0.22	0.22	0.31	0.32
87	0.95	0.21	0.59	----	----	0.68
88	0.30	0.41	0.20	----	----	----
99	0.39	0.47	0.45	0.57	0.57	0.31
100	0.38	0.30	0.45	0.53	0.53	0.57
101	0.57	1.04	0.75	1.00	1.00	0.53

TABLE AII.200

FECAL BENZIDINE REACTION: FLIGHT 1
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	tr	0	0	+	0
2	0	0	--	--	tr
3	+2	tr	"-"	tr	0
4	+1	0	"-"	tr	0
5	+1	+2	--	--	+1
6	0	0	"-"	tr	+1
7	0	tr	0	+1	0
8	tr	tr	0	+1	tr
9	0	"-"	0	0	tr
10	+1	"-"	0	tr	0
11	0	"-"	tr	tr	tr
12	+1	"-"	0	0	tr
13	+1	+2	0	--	--
14	+2	"-"	"-"	0	+3
15	tr	0	0	--	--
16	+1	tr	0	--	--
17	0	+2	0	+1	+3
18	0	+1	0	0	tr
19	tr	tr	0	+1	tr
20	tr	0	0	--	--
21	tr	tr	0	+1	tr
22	+1	+1	0	+2	+1
90	0	0	0	tr	0
91	tr	tr	tr	0	tr
92	0	0	0	0	0

TABLE AII.201

FECAL BENZIDINE REACTION: FLIGHT 2
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	tr	0	0	+1	0
24	0	0	0	0	--
25	tr	0	0	tr	0
26	tr	"-"	"-"	0	+1
27	tr	tr	0	0	+3
28	0	0	tr	0	+1
29	tr	tr	0	0	tr
30	0	0	0	0	tr
31	tr	tr	"-"	0	0
32	tr	"-"	0	0	0
33	+1	+1	0	tr	tr
34	+1	+1	+1	tr	tr
35	0	tr	0	0	0
36	tr	+1	0	0	tr
37	+1	+2	0	tr	+2
38	+1	+2	+1	0	+1
39	0	tr	0	"-"	--
40	0	tr	"-"	0	0
41	0	0	--	--	0
42	tr	"-"	0	tr	+1
43	0	+1	tr	+1	0
44	tr	tr	0	+1	0
93	--	--	--	--	--
94	tr	+1	+1	tr	0
95	0	tr	tr	0	0
102	--	--	--	0	0

TABLE AII.202

FECAL BENZIDINE REACTION: FLIGHT 3
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	+1	tr	0	0	0
46	+1	0	0	0	+2
47	tr	"-"	0	+1	tr
48	tr	tr	0	0	+1
49	0	tr	"-"	0	0
50	+2	+1	"-"	0	tr
51	0	0	0	tr	0
52	tr	+3	0	tr	+1
53	+1	+1	0	0	+1
54	+2	+1	0	+1	+1
55	tr	"-"	0	tr	+1
56	tr	0	0	+2	0

TABLE AII.202 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
57	tr	0	0	0	tr
58	tr	+1	0	+2	0
59	--	--	0	+1	0
60	0	tr	0	0	0
61	0	tr	0	0	0
62	tr	tr	0	tr	0
63	0	"-"	0	0	tr
64	tr	tr	0	tr	+1
65	+1	+1	0	tr	tr
66	0	tr	0	tr	+1
96	tr	tr	+2	0	tr
97	0	0	0	0	0
98	0	+1	+1	tr	+1

TABLE AII.203

FECAL BENZIDINE REACTION: FLIGHT 4
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	0	"-"	"-"	tr	tr
68	tr	+1	"-"	+1	+1
69	tr	"-"	0	tr	+1
70	0	"-"	"-"	+1	0
71	0	+1	0	tr	+1
72	0	tr	"-"	+1	tr
73	tr	+1	0	tr	--
74	0	0	0	tr	+1
75	0	"-"	0	tr	+2
76	0	0	0	+3	+2
77	tr	tr	--	--	--
78	0	"-"	+1	+3	+1
79	0	tr	0	0	tr
80	0	"-"	0	+1	0
81	tr	tr	0	+2	tr
82	0	tr	0	--	0
83	0	0	0	tr	0
84	tr	tr	0	+1	tr
85	tr	0	0	tr	+1
86	0	+2	0	tr	+1
87	+1	tr	"-"	--	0
88	0	+1	"-"	--	--
99	0	0	0	tr	tr
100	0	0	tr	0	0
101	0	0	0	0	0

TABLE AII.204

FECAL FIBERS: FLIGHT 1
(No./H.P.F.)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	3 - 4	4 - 6	0	2 - 4	2 - 4
2	0 - 3	0 - 2	-	-	0 - 2
3	3 - 4	0 - 2	" - "	0 - 2	0 - 2
4	1 - 2	2 - 4	" - "	6 - 8	4 - 6
5	1 - 2	6 - 8	-	-	1 - 3
6	4 - 6	" - "	" - "	4 - 6	4 - 6
7	2 - 4	8 - 10	0 - 1	4 - 6	4 - 6
8	6 - 8	10 - 15	4 - 6	3 - 6	2 - 4
9	6 - 8	" - "	3 - 6	8 - 10	4 - 6
10	5 - 6	" - "	0 - 2	4 - 6	2 - 4
11	3 - 6	" - "	6 - 8	4 - 6	0 - 2
12	3 - 6	" - "	4 - 6	4 - 6	0 - 2
13	2 - 4	15 - 20	2 - 3	-	-
14	10 - 15	" - "	" - "	10 - 15	4 - 6
15	2 - 6	6 - 8	0 - 1	-	-
16	2 - 4	0 - 2	0	-	-
17	2 - 3	10 - 15	4 - 6	4 - 6	4 - 6
18	2 - 4	4 - 6	3 - 6	6 - 8	4 - 6
19	6 - 8	6 - 8	3 - 6	6 - 8	4 - 6
20	1 - 3	6 - 8	4 - 6	-	-
21	2 - 4	2 - 4	4 - 6	8 - 10	0 - 2
22	0 - 2	4 - 6	6 - 8	8 - 10	1 - 3
90	1 - 4	8 - 10	3 - 5	2 - 4	2 - 4
91	2 - 4	2 - 4	0 - 2	2 - 4	0 - 1
92	2 - 4	2 - 4	2 - 4	1 - 3	1 - 3

TABLE AII.205

FECAL FIBERS: FLIGHT 2
(No./H.P.F.)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	4 - 8	4 - 6	6 - 8	10 - 12	3 - 6
24	0	0 - 1	0 - 3	0 - 2	-
25	0 - 2	1 - 3	0 - 1	10 - 12	0 - 2
26	2 - 4	" - "	" - "	6 - 8	0 - 1
27	3 - 6	4 - 6	5 - 7	4 - 6	6 - 8
28	3 - 6	2 - 4	2 - 4	8 - 10	4 - 6
29	8 - 10	8 - 10	4 - 6	0 - 2	2 - 4
30	2 - 4	2 - 4	3 - 6	2 - 4	0 - 1
31	4 - 6	4 - 6	" - "	2 - 4	0 - 2
32	2 - 4	" - "	0 - 2	6 - 8	0 - 2
33	6 - 8	10 - 12	8 - 10	8 - 10	2 - 4
34	2 - 4	6 - 8	8 - 10	4 - 6	4 - 6

TABLE AII.205 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
35	2 - 4	4 - 6	2 - 4	6 - 8	2 - 4
36	2 - 4	4 - 6	0 - 1	8 - 10	3 - 6
37	2 - 4	2 - 4	4 - 6	6 - 8	2 - 4
38	1 - 3	2 - 4	0 - 3	0 - 2	0 - 3
39	1 - 3	2 - 4	0 - 2	" - "	-
40	1 - 3	2 - 4	" - "	8 - 10	2 - 4
41	2 - 4	2 - 4	-	-	0 - 1
42	4 - 6	" - "	6 - 8	2 - 4	4 - 6
43	4 - 6	2 - 4	8 - 10	4 - 6	4 - 6
44	8 - 10	4 - 6	8 - 10	2 - 4	0 - 2
93	-	-	-	-	-
94	2 - 4	4 - 6	2 - 4	1 - 3	2 - 4
95	4 - 6	2 - 4	6 - 8	2 - 4	2 - 4
102	-	-	-	2 - 4	0 - 2

TABLE AII.206

FECAL FIBERS: FLIGHT 3
(No./H.P.F.)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	8 - 10	6 - 8	4 - 6	2 - 4	0 - 2
46	8 - 10	8 - 10	0 - 3	8 - 10	6 - 8
47	6 - 8	" - "	4 - 6	2 - 4	2 - 4
48	6 - 8	4 - 6	8 - 10	8 - 10	2 - 4
49	0 - 2	1 - 3	" - "	4 - 6	0
50	1 - 3	6 - 8	" - "	6 - 8	6 - 8
51	2 - 4	6 - 8	2 - 4	6 - 8	4 - 6
52	4 - 6	8 - 10	0 - 1	2 - 4	2 - 4
53	3 - 6	4 - 6	2 - 4	0 - 2	1 - 3
54	6 - 8	6 - 8	0	4 - 6	1 - 3
55	2 - 4	" - "	2 - 4	0 - 2	1 - 3
56	2 - 4	4 - 6	2 - 4	4 - 6	2 - 4
57	3 - 6	2 - 4	0 - 2	1 - 3	4 - 6
58	8 - 10	6 - 8	4 - 6	4 - 6	0 - 1
59	-	-	0	2 - 4	0 - 1
60	2 - 4	2 - 4	0 - 1	0 - 2	2 - 3
61	4 - 6	4 - 6	4 - 6	2 - 4	1 - 3
62	8 - 10	8 - 10	4 - 6	3 - 6	4 - 6
63	0 - 2	" - "	0	4 - 6	0 - 2
64	2 - 4	6 - 8	2 - 4	2 - 4	2 - 4
65	4 - 6	3 - 5	4 - 6	2 - 4	0 - 2
66	4 - 6	4 - 6	3 - 5	0 - 2	2 - 4
96	6 - 8	6 - 8	2 - 4	6 - 8	4 - 6
97	4 - 6	0 - 2	0 - 3	0 - 2	2 - 4
98	0 - 2	2 - 4	2 - 4	2 - 4	0

TABLE AII.207

FECAL FIBERS: FLIGHT 4
(No./H.P.F.)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	8 - 10	" - "	" - "	0 - 2	2 - 4
68	8 - 10	0 - 2	" - "	4 - 6	4 - 6
69	6 - 8	" - "	0 - 1	4 - 6	2 - 4
70	6 - 8	" - "	" - "	4 - 6	1 - 3
71	2 - 4	2 - 4	0 - 2	2 - 4	0 - 2
72	2 - 4	0 - 2	" - "	2 - 4	0 - 2
73	6 - 8	8 - 10	0	0	-
74	6 - 8	0 - 1	0	0 - 2	4 - 6
75	8 - 10	" - "	10 - 12	0 - 2	2 - 4
76	8 - 10	8 - 10	3 - 6	2 - 4	4 - 6
77	2 - 4	1 - 3	-	-	-
78	4 - 6	" - "	2 - 4	4 - 6	4 - 6
79	6 - 8	0 - 2	2 - 4	6 - 8	2 - 4
80	2 - 4	" - "	2 - 4	0 - 2	0 - 2
81	4 - 6	4 - 6	0 - 1	2 - 4	2 - 4
82	4 - 6	4 - 6	0 - 2	-	0 - 2
83	4 - 6	4 - 6	4 - 6	2 - 4	0 - 1
84	4 - 6	2 - 4	4 - 6	2 - 4	2 - 4
85	4 - 6	4 - 6	4 - 6	4 - 6	1 - 3
86	3 - 6	4 - 6	4 - 6	4 - 6	2 - 4
87	8 - 10	4 - 6	" - "	-	0
88	0 - 2	4 - 6	" - "	-	-
99	2 - 4	0 - 3	2 - 4	4 - 6	0 - 1
100	0 - 2	0 - 2	0 - 2	2 - 4	2 - 4
101	2 - 4	4 - 6	0 - 2	2 - 4	0 - 2

TABLE AII.208

RESTING CREATININE CLEARANCE: FLIGHT 1
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	149	161	99	83	123	158
2	162	152	---	---	---	183
3	141	139	118	155	130	185
4	155	176	94	172	176	181
5	126	146	---	---	---	127
6	154	174	137	96	172	138
7	161	192	136	121	164	186
8	157	160	102	110	106	162
9	226	179	188	150	156	158
10	148	152	207	121	124	135
11	141	170	178	129	137	160
12	131	178	166	163	179	163

TABLE AII.208 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	131	150	106	---	---	---
14	108	129	119	133	131	149
15	155	245	175	104	83	---
16	192	204	181	---	---	---
17	199	(167)	161	117	190	232
18	153	153	171	122	54	176
19	159	162	155	127	188	114
20	107	175	182	---	---	---
21	141	159	152	122	203	160
22	147	161	164	132	127	129
90	153	204	228	256	227	191
91	---	330	272	244	280	179
92	124	171	151	156	151	143

TABLE AII.209

RESTING CREATININE CLEARANCE: FLIGHT 2
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	156	192	161	108	281	196
24	115	125	142	89	---	---
25	116	149	99	113	189	166
26	94	180	119	97	129	147
27	130	130	148	122	98	129
28	196	172	130	141	131	208
29	155	149	171	91	107	184
30	(147)	133	149	65	127	139
31	156	204	235	154	156	163
32	124	159	136	134	125	130
33	165	197	161	145	123	136
34	131	156	199	149	108	137
35	132	175	149	94	121	113
36	119	146	221	71	132	143
37	168	182	175	94	142	174
38	65	172	180	97	169	182
39	100	163	157	115	---	---
40	197	(163)	---	178	---	---
41	125	160	114	---	---	147
42	186	178	172	83	131	145
43	233	143	157	192	132	143
44	219	167	118	141	119	126
93	117	---	---	---	---	---
94	266	---	291	223	193	270
95	161	163	178	172	141	190
102	---	---	---	208	123	207

TABLE AII.210

RESTING CREATININE CLEARANCE: FLIGHT 3
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	64	182	116	110	145	138
46	177	175	95	117	122	136
47	164	160	127	96	105	116
48	133	185	103	85	188	141
49	163	219	132	149	171	140
50	157	180	85	103	155	128
51	155	198	102	157	175	147
52	226	214	109	108	144	136
53	160	199	94	138	104	118
54	185	175	126	143	181	165
55	195	175	131	164	133	122
56	150	171	134	204	188	163
57	169	199	143	176	184	174
58	236	175	---	153	156	132
59	(169)	(196)	116	168	168	163
60	213	216	141	213	216	214
61	126	200	127	157	193	166
62	156	238	38	151	81	160
63	177	220	157	159	169	159
64	184	221	164	162	160	199
65	178	178	158	126	171	164
66	187	234	210	143	210	164
96	192	194	214	224	154	224
97	165	193	204	194	147	196
98	118	133	169	172	147	201

TABLE AII.211

RESTING CREATININE CLEARANCE: FLIGHT 4
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	156	163	115	124	149	151
68	180	205	138	140	181	---
69	207	167	151	141	177	178
70	82	153	155	118	119	145
71	143	185	128	123	186	154
72	143	206	85	124	182	164
73	163	168	138	133	---	---
74	232	174	103	167	168	152
75	152	144	178	155	165	166
76	147	169	145	127	142	159
77	142	278	---	---	---	---
78	163	150	148	141	220	158

TABLE AII.211 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	197	204	200	169	170	127
80	140	142	173	127	156	105
81	125	154	138	143	147	111
82	(161)	221	118	---	---	225
83	171	219	181	146	197	190
84	192	191	184	130	163	167
85	142	150	131	162	197	168
86	132	155	186	155	179	135
87	213	204	---	---	---	186
88	164	154	---	---	---	---
99	161	130	130	115	138	166
100	168	154	202	131	149	191
101	216	171	205	211	203	208

TABLE AII.212

RESTING URINE/SERUM OSMOTIC RATIO: FLIGHT 1

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	3.86	3.33	4.19	5.71	2.95	3.14
2	2.08	2.14	----	----	----	2.29
3	1.57	1.79	4.17	3.29	3.22	1.10
4	3.07	3.66	4.50	3.23	2.37	1.99
5	1.76	1.06	1.31	----	----	1.14
6	1.55	2.36	2.78	2.22	1.16	1.12
7	0.72	0.96	0.760	1.84	1.30	1.19
8	1.74	2.53	1.74	1.43	1.04	2.28
9	1.98	3.43	4.21	3.47	2.56	2.51
10	1.37	2.93	3.62	2.30	1.25	3.13
11	0.99	1.01	2.40	3.21	0.78	1.21
12	1.38	1.91	2.25	2.33	1.46	1.42
13	2.23	3.23	4.20	----	----	----
14	1.62	1.62	2.45	1.00	1.18	1.28
15	1.64	2.38	2.86	1.00	1.97	----
16	1.24	1.24	2.54	----	----	----
17	3.48	----	3.45	3.39	3.40	3.38
18	1.03	1.08	1.58	1.02	0.70	1.33
19	1.54	1.66	3.30	2.73	1.55	2.76
20	1.24	1.22	2.11	----	----	----
21	1.02	1.97	2.90	1.16	1.08	1.57
22	1.21	1.92	0.88	1.55	1.07	1.55
90	0.87	3.25	3.68	3.15	2.34	3.53
91	1.045	2.05	1.73	1.65	1.90	2.42
92	1.04	1.30	1.37	1.42	2.54	2.89

TABLE AII.213

RESTING URINE/SERUM OSMOTIC RATIO: FLIGHT 2

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	2.74	3.84	4.39	3.49	2.44	2.02
24	2.62	3.43	4.32	2.69	----	----
25	3.24	3.32	4.00	3.18	2.01	1.37
26	2.46	1.97	3.04	2.50	1.34	1.06
27	3.09	3.85	3.92	0.53	2.83	1.58
28	1.27	2.60	3.88	4.19	1.52	1.29
29	3.13	3.76	3.36	1.51	1.53	2.08
30	----	3.37	3.18	2.36	1.34	3.45
31	3.55	3.28	2.39	2.00	0.993	1.34
32	3.47	2.63	2.71	3.31	2.11	1.29
33	1.76	3.74	3.77	4.11	1.16	1.28
34	2.16	3.37	3.76	4.02	2.81	2.21
35	3.24	2.24	4.14	2.46	1.20	2.17
36	2.46	3.50	4.43	0.38	1.22	2.99
37	2.96	3.87	3.78	3.15	1.58	2.38
38	3.49	3.57	3.64	3.87	0.91	1.51
39	3.53	4.44	4.02	2.27	----	----
40	2.82	----	----	1.02	1.60	2.23
41	3.15	3.34	4.01	----	----	1.70
42	1.92	3.29	3.08	3.31	2.11	1.11
43	4.01	4.12	3.59	3.53	2.90	3.05
44	2.15	3.17	4.27	3.55	0.94	1.22
93	2.91	----	----	----	----	----
94	2.54	3.28	0.560	1.49	0.91	0.90
95	1.44	1.02	2.91	1.07	0.982	0.77
102	----	----	----	1.60	1.21	1.10

TABLE AII.214

RESTING URINE/SERUM OSMOTIC RATIO: FLIGHT 3

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	1.15	3.38	3.04	2.79	1.30	2.46
46	0.55	3.45	2.80	2.57	2.57	1.54
47	1.42	1.76	3.42	2.48	1.11	2.22
48	1.03	1.32	3.41	3.00	1.26	1.44
49	1.02	3.07	0.71	0.56	1.10	1.74
50	1.08	3.63	1.30	1.49	1.23	3.16
51	3.06	3.12	1.22	0.54	1.79	2.93
52	2.19	2.54	1.14	2.60	1.85	2.83
53	2.51	3.27	3.01	3.65	3.02	3.84
54	3.45	3.70	2.73	2.48	1.21	2.40
55	1.21	1.40	2.92	3.80	1.17	1.42
56	0.86	3.52	3.09	2.68	1.22	1.42

TABLE AII.214 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	2.07	2.88	0.94	1.87	1.23	1.93
58	1.69	2.51	----	1.84	1.26	2.16
59	----	----	2.35	1.70	1.36	1.34
60	0.84	3.54	0.91	1.73	2.27	2.93
61	1.33	2.82	2.98	2.65	1.18	2.00
62	2.30	2.70	2.87	2.70	1.57	1.98
63	1.37	1.76	1.88	1.74	1.12	1.62
64	1.26	1.54	2.18	1.05	0.84	1.39
65	3.02	3.81	3.71	4.16	1.30	4.01
66	1.61	2.98	1.11	3.17	1.44	3.06
96	2.05	3.93	1.27	2.46	1.84	1.41
97	2.73	2.98	2.64	2.69	1.54	2.33
98	0.95	0.89	1.77	1.43	1.15	1.28

TABLE AII.215

RESTING URINE/SERUM OSMOTIC RATIO: FLIGHT 4

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	2.57	2.33	3.46	3.21	1.38	1.42
68	2.88	3.94	3.62	3.02	1.57	----
69	1.58	3.82	3.54	1.18	1.00	3.01
70	1.51	3.42	3.62	3.59	1.64	1.36
71	2.54	3.69	2.21	0.77	1.61	2.86
72	2.27	4.02	2.89	2.53	1.18	2.28
73	1.04	3.44	1.26	0.613	----	----
74	1.46	2.96	0.90	0.94	2.01	2.40
75	3.77	3.98	3.05	2.32	2.76	2.72
76	3.23	3.01	2.86	3.56	1.48	3.58
77	3.83	4.02	----	----	----	----
78	2.82	4.10	4.04	3.92	2.75	3.67
79	1.36	2.80	2.50	1.62	2.34	2.06
80	2.38	2.74	3.33	1.38	2.24	1.93
81	2.15	2.51	2.71	1.63	2.03	2.32
82	----	3.73	3.81	----	----	3.01
83	2.45	2.62	3.62	3.26	1.96	1.62
84	2.70	3.67	2.46	3.78	2.49	2.64
85	1.60	3.92	3.44	4.29	2.19	3.43
86	3.21	3.65	2.80	3.32	2.31	2.97
87	3.46	3.47	----	----	----	3.02
88	1.95	2.80	----	----	----	----
99	1.77	4.20	3.46	0.47	3.37	3.69
100	2.96	2.86	2.43	1.44	2.28	2.08
101	0.84	1.84	1.52	0.80	0.66	1.61

TABLE AII.216

RESTING OSMOTIC CLEARANCE: FLIGHT 1
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	3.06	2.20	1.42	1.18	2.55	3.53
2	2.10	2.04	----	----	----	3.38
3	2.71	2.59	1.58	3.30	2.46	2.90
4	2.95	2.92	1.25	2.45	4.77	4.27
5	3.30	3.36	0.22	----	----	3.29
6	3.90	3.93	1.25	0.91	4.76	4.69
7	2.17	3.30	0.95	0.93	3.58	4.04
8	1.79	3.06	0.56	0.38	3.76	2.91
9	4.02	3.58	1.94	2.76	5.39	3.83
10	2.92	2.68	2.27	2.73	3.32	2.35
11	3.51	4.40	2.61	3.35	4.28	3.50
12	3.14	4.03	3.05	3.88	5.93	5.57
13	4.07	3.60	1.09	----	----	----
14	3.21	3.11	1.24	1.42	4.73	3.91
15	4.44	2.24	2.14	1.58	2.44	----
16	2.92	4.62	2.14	----	----	----
17	3.80	(3.34)	3.87	2.01	3.72	3.79
18	2.60	3.26	1.33	1.24	1.70	3.89
19	2.39	4.22	2.39	2.69	4.06	1.52
20	2.90	3.61	1.77	----	----	----
21	3.03	3.86	2.07	2.79	3.61	4.38
22	4.04	3.62	2.58	3.24	3.92	3.50
90	2.99	2.72	2.27	3.26	3.00	2.86
91	0.55	5.02	3.81	5.96	5.41	3.20
92	2.33	2.20	2.05	2.56	1.79	1.64

TABLE AII.217

RESTING OSMOTIC CLEARANCE: FLIGHT 2
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	4.23	2.23	1.66	1.20	6.43	4.01
24	2.82	2.02	1.78	2.39	----	----
25	2.72	1.61	2.00	1.52	4.75	3.98
26	2.51	3.02	1.16	1.43	3.16	2.80
27	1.96	1.50	1.00	0.24	3.18	1.95
28	3.98	3.20	1.19	1.09	4.09	3.45
29	3.35	2.34	0.93	0.88	3.53	2.75
30	(2.91)	1.72	0.78	0.64	3.01	3.02
31	2.70	3.10	2.03	2.64	2.76	3.27
32	3.42	4.88	0.88	2.48	3.96	3.23
33	2.87	2.16	2.15	2.30	2.86	2.42
34	3.52	1.83	1.95	3.01	3.33	2.65

TABLE AII.217 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	2.64	1.30	1.26	1.30	3.82	2.86
36	3.13	3.57	1.52	0.75	3.66	3.35
37	2.72	2.36	2.21	1.03	3.61	3.25
38	1.43	2.34	1.72	1.14	3.23	3.78
39	1.47	2.37	1.70	2.26	----	----
40	5.02	(2.42)	----	1.83	1.92	0.41
41	2.83	1.88	2.19	----	----	3.13
42	2.88	2.81	1.88	2.18	3.05	4.29
43	2.00	2.29	1.94	3.17	1.82	2.24
44	2.94	2.35	2.07	3.16	3.96	3.29
93	2.78	----	----	----	----	----
94	4.46	----	3.10	4.14	3.66	3.08
95	2.19	2.45	1.82	3.40	2.77	2.68
102	----	----	----	3.14	2.69	3.64

TABLE AII.218

RESTING OSMOTIC CLEARANCE: FLIGHT 3
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	4.36	3.47	1.79	0.97	4.18	5.30
46	1.40	3.24	1.15	1.16	5.02	6.88
47	3.72	3.46	1.52	1.01	3.90	3.54
48	4.05	5.26	1.56	0.76	5.36	5.54
49	3.37	2.04	0.88	0.59	3.75	3.32
50	1.22	3.01	0.58	0.47	3.72	2.81
51	4.20	2.48	0.77	0.62	3.83	2.60
52	1.90	2.98	0.58	0.39	3.78	2.67
53	3.03	2.36	1.41	1.21	1.68	2.01
54	3.12	2.84	1.60	1.31	4.91	3.94
55	3.12	3.48	2.23	1.78	3.99	3.83
56	2.42	3.71	2.24	2.48	3.88	5.45
57	3.10	2.73	1.44	1.17	4.41	3.69
58	4.41	2.33	----	2.74	2.77	3.45
59	(3.44)	(3.10)	2.24	1.94	4.34	3.85
60	3.05	1.60	2.17	1.36	3.08	1.91
61	3.39	3.26	1.52	1.98	4.02	3.26
62	4.12	3.32	0.29	1.34	2.45	4.51
63	3.71	3.00	2.03	2.31	4.97	2.60
64	5.35	4.04	1.92	2.50	3.41	4.58
65	4.82	2.55	1.76	1.95	4.26	2.30
66	4.32	4.02	2.57	2.48	5.27	2.12
96	3.64	3.44	4.07	3.97	3.25	4.04
97	3.09	2.06	2.88	2.61	2.38	2.50
98	2.55	2.80	3.05	2.79	3.71	3.49

TABLE AII.219

RESTING OSMOTIC CLEARANCE: FLIGHT 4
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	4.62	2.91	1.82	1.26	4.79	3.80
68	2.62	2.33	1.39	0.88	5.17	----
69	2.70	1.70	1.44	1.42	3.24	2.75
70	1.62	2.72	1.45	0.98	3.49	3.21
71	2.08	2.52	0.69	0.75	4.73	3.86
72	2.44	2.09	0.83	0.64	3.73	2.74
73	3.04	1.99	0.88	0.50	----	----
74	3.58	2.61	0.77	0.53	3.76	2.91
75	1.98	1.90	1.85	1.72	1.96	2.67
76	1.83	1.96	2.19	1.50	3.46	2.22
77	1.52	1.67	----	----	----	----
78	2.64	2.24	2.20	2.12	3.67	3.02
79	3.32	2.40	1.72	1.68	2.93	2.04
80	2.82	2.52	1.43	1.28	3.06	3.00
81	2.42	2.12	1.64	2.04	2.99	2.58
82	(2.65)	5.28	1.54	----	----	4.03
83	3.78	3.46	1.96	1.60	5.22	4.78
84	2.65	2.36	1.56	1.34	3.34	4.09
85	1.92	1.65	0.87	1.36	3.99	2.25
86	1.87	1.57	1.41	1.50	3.40	2.62
87	2.72	2.83	----	----	----	2.32
88	3.40	2.79	----	----	----	----
99	2.67	1.50	2.40	1.84	1.45	1.89
100	2.14	1.88	3.37	2.23	2.80	4.28
101	3.31	2.55	4.00	2.55	2.60	3.24

TABLE AII.220

RESTING UREA CLEARANCE: FLIGHT 1
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	48.5	38.3	40.0	38.3	59.1	75.3
2	33.6	48.4	----	----	----	80.9
3	37.4	59.1	46.3	72.5	55.5	89.7
4	55.1	66.6	69.1	58.1	91.8	110.9
5	59.8	67.5	74.3	----	----	95.8
6	55.9	65.0	62.4	26.3	90.6	126.0
7	33.2	59.6	90.0	25.0	69.8	135.2
8	30.6	50.5	43.6	14.7	84.4	88.3
9	43.6	56.7	81.1	68.3	95.5	85.3
10	74.3	102.4	47.9	77.5	86.0	90.4
11	76.3	106.1	76.4	71.0	90.1	57.1
12	48.0	88.2	58.0	82.7	94.3	111.1

TABLE AII.220 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	75.8	90.6	46.3	----	----	----
14	45.1	86.1	37.2	67.6	99.4	96.5
15	78.2	77.5	44.8	50.0	29.4	----
16	75.7	87.4	26.8	----	----	----
17	61.3	(70.3)	45.0	64.0	57.0	120.0
18	69.1	82.1	53.0	45.9	38.0	100.6
19	63.0	47.1	44.6	57.8	77.3	45.1
20	43.7	72.0	60.4	----	----	----
21	80.7	45.9	51.6	56.3	78.3	88.8
22	63.0	79.1	69.5	77.8	51.6	80.0
90	78.8	98.6	87.4	69.4	69.7	65.6
91	----	114.9	95.4	128.6	105.7	64.0
92	43.8	55.2	48.0	78.0	39.6	50.3

TABLE AII.221

RESTING UREA CLEARANCE: FLIGHT 2
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	63.2	51.7	40.7	45.8	105.8	83.2
24	59.2	36.6	35.7	57.9	----	----
25	44.4	32.2	59.2	49.6	63.4	103.7
26	52.7	59.7	53.7	49.0	45.2	64.4
27	49.7	50.8	49.1	64.2	54.2	52.6
28	70.6	49.6	41.7	42.9	58.8	68.8
29	71.3	40.1	49.5	----	34.6	80.0
30	(54.9)	34.5	38.3	37.1	52.4	62.0
31	59.7	54.2	53.3	40.9	52.2	92.9
32	58.5	83.0	39.4	63.5	54.4	173.2
33	69.6	38.4	51.4	51.7	57.9	74.0
34	57.4	51.2	60.0	60.9	68.4	69.7
35	39.8	35.8	46.4	45.0	61.8	66.1
36	51.0	80.8	38.4	44.9	61.5	58.0
37	48.5	55.1	47.8	30.7	58.8	56.0
38	37.9	62.5	39.5	31.6	62.6	102.5
39	37.5	52.3	37.0	56.5	----	----
40	85.2	(51.8)	----	92.2	62.7	----
41	59.5	42.9	----	----	----	----
42	48.7	63.2	38.6	52.0	62.2	97.6
43	52.9	58.6	48.7	52.0	52.0	67.2
44	35.1	55.7	40.9	59.8	97.4	96.6
93	42.4	----	----	----	----	----
94	101.0	----	75.0	82.6	81.0	74.4
95	66.3	86.9	58.0	70.6	74.0	57.0
102	----	----	----	28.6	54.7	51.5

TABLE AII.222

RESTING UREA CLEARANCE: FLIGHT 3
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	----	82.6	52.1	27.9	64.2	104.6
46	66.6	88.0	35.0	41.6	82.1	156.4
47	78.4	85.9	42.1	19.8	79.1	79.8
48	66.5	100.0	46.7	22.0	90.4	120.5
49	66.4	66.1	63.3	28.1	69.8	90.0
50	51.2	50.9	32.7	24.6	74.7	51.5
51	74.4	63.5	69.9	38.4	111.3	49.5
52	26.1	68.5	35.5	17.7	77.1	43.8
53	67.0	59.8	55.9	35.5	64.5	48.0
54	76.9	81.3	68.8	45.0	173.2	49.1
55	70.2	87.3	84.7	55.3	70.6	70.1
56	53.2	79.2	74.4	73.5	65.0	74.1
57	65.0	84.4	94.5	87.2	91.7	67.8
58	103.9	54.0	----	58.1	40.7	48.8
59	(76.5)	(70.5)	67.4	70.6	62.7	51.9
60	117.0	51.6	93.1	41.5	58.8	62.8
61	89.8	63.4	69.3	45.9	60.0	55.6
62	96.1	75.7	45.3	55.9	24.4	81.3
63	110.4	62.1	70.0	63.6	55.6	59.9
64	86.8	45.5	68.1	56.9	56.1	60.4
65	69.2	64.7	60.7	54.7	83.6	47.1
66	94.5	66.2	91.7	50.0	137.5	62.8
96	60.4	86.1	74.2	85.6	51.6	55.0
97	59.8	83.8	58.4	45.9	48.5	55.6
98	45.4	64.3	60.0	92.1	63.8	46.1

TABLE AII.223

RESTING UREA CLEARANCE: FLIGHT 4
(ml/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	90.2	38.8	54.5	42.7	103.0	81.1
68	82.7	45.3	51.3	30.4	69.8	----
69	89.1	34.3	61.0	52.5	63.1	50.4
70	35.4	49.3	50.7	35.3	67.8	64.5
71	52.4	32.1	75.0	41.2	77.6	58.0
72	61.9	44.5	----	35.8	52.1	53.5
73	48.9	60.2	73.7	38.2	----	----
74	37.8	66.7	45.4	38.2	74.5	49.6
75	47.8	39.5	66.8	43.8	48.9	45.2
76	44.8	40.9	50.1	----	71.6	31.9
77	56.5	40.2	----	----	----	----
78	61.0	44.4	32.1	63.6	89.2	46.4

TABLE AII.223 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	57.3	71.4	99.1	73.2	62.6	42.1
80	70.0	54.0	32.5	49.0	68.5	56.2
81	59.5	57.5	120.3	60.9	65.8	40.8
82	(59.3)	80.0	39.9	----	----	64.7
83	49.5	88.2	71.7	54.1	124.3	101.4
84	64.3	53.1	74.5	48.8	64.5	68.4
85	46.0	32.4	57.1	53.8	95.3	50.6
86	40.5	49.4	44.9	46.3	60.4	35.1
87	65.6	61.8	----	----	----	47.6
88	87.6	60.9	----	----	----	----
99	62.4	53.1	36.5	48.0	40.4	40.7
100	57.4	48.7	51.3	46.4	40.4	56.6
101	64.3	68.8	72.4	73.7	102.2	57.5

TABLE AII.224

LYING SYSTOLIC BLOOD PRESSURE: FLIGHT 1
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	110	110	110	110	108	110
2	122	118	---	---	---	104
3	104	112	108	110	112	110
4	94	100	110	94	104	98
5	104	110	100	---	---	108
6	112	112	98	116	132	118
7	100	90	100	106	96	108
8	90	108	98	112	112	114
9	106	130	130	124	112	124
10	94	110	104	120	110	106
11	110	120	122	116	110	110
12	94	110	108	124	108	110
13	107	110	110	---	---	---
14	90	122	110	120	108	116
15	96	118	120	120	130	---
16	124	100	110	---	---	---
17	130	(108)	108	130	100	118
18	126	90	122	120	126	102
19	112	94	110	114	104	120
20	126	122	90	---	---	---
21	126	60	92	126	104	110
22	120	120	102	118	92	104
90	122	122	126	112	120	110
91	118	90	108	110	100	110
92	126	100	90	110	102	116

TABLE AII.225

LYING SYSTOLIC BLOOD PRESSURE: FLIGHT 2
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	120	120	108	114	110	124
24	110	106	92	114	---	---
25	100	104	112	114	108	110
26	100	110	98	90	82	96
27	90	100	100	96	90	88
28	110	128	110	108	122	106
29	110	104	98	96	96	104
30	(105)	110	112	110	108	108
31	110	112	150	124	110	124
32	100	98	93	110	90	94
33	118	110	120	104	118	98
34	134	126	130	128	104	108
35	106	122	92	116	106	112
36	107	84	100	88	114	104
37	104	98	92	108	108	112
38	114	115	110	110	108	98
39	102	95	110	120	---	---
40	90	(106)	---	110	114	116
41	94	105	---	---	---	112
42	102	100	104	112	108	98
43	96	86	90	98	96	108
44	90	100	92	108	104	112
93	96	---	---	---	---	---
94	118	128	112	132	112	118
95	132	130	118	120	118	116
102	---	---	---	112	122	112

TABLE AII.226

LYING SYSTOLIC BLOOD PRESSURE: FLIGHT 3
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	110	88	102	90	96	102
46	110	108	102	90	116	120
47	118	112	102	108	116	116
48	140	125	112	112	104	114
49	90	88	94	90	108	94
50	110	100	94	104	98	102
51	108	105	102	98	118	116
52	112	125	118	142	102	118
53	102	106	114	98	112	104
54	120	102	106	92	96	112

TABLE AII.226 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
55	110	104	110	94	104	90
56	94	112	110	98	108	118
57	115	104	109	108	98	106
58	120	122	---	108	122	106
59	(112)	(107)	130	122	112	120
60	108	104	104	108	92	108
61	120	90	104	110	116	114
62	94	100	106	90	100	104
63	146	102	130	98	112	108
64	110	122	118	118	122	106
65	80	112	102	98	108	92
66	130	112	112	102	98	116
96	114	112	138	96	104	122
97	120	130	114	98	122	104
98	115	120	102	102	102	114

TABLE AII.227

LYING SYSTOLIC BLOOD PRESSURE: FLIGHT 4
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	118	100	110	118	118	108
68	105	115	122	104	114	---
69	125	95	102	108	90	96
70	108	90	92	96	112	86
71	118	115	122	116	98	128
72	124	108	120	112	90	112
73	95	118	120	114	---	---
74	145	132	114	108	106	128
75	110	98	128	120	96	110
76	108	104	118	104	118	106
77	100	110	---	---	---	---
78	90	88	100	104	100	98
79	104	98	100	98	88	112
80	94	86	92	110	104	108
81	96	86	100	114	102	108
82	(109)	110	138	---	---	106
83	104	100	88	88	112	114
84	98	100	92	94	104	102
85	116	106	110	94	108	126
86	100	110	112	102	96	122
87	116	160	---	---	---	118
88	116	108	---	---	---	---
99	100	86	108	88	106	116
100	118	100	112	104	122	106
101	120	110	112	106	96	110

TABLE AII.228

STANDING SYSTOLIC BLOOD PRESSURE: FLIGHT 1
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	118	128	112	105	115	112
2	110	100	---	---	---	98
3	112	100	86	108	84	105
4	110	110	110	96	88	88
5	110	130	110	---	---	114
6	110	140	110	116	116	135
7	112	100	94	106	93	100
8	105	110	110	112	104	107
9	125	120	100	128	108	130
10	105	130	90	124	100	88
11	115	100	83	116	94	92
12	105	106	97	126	88	96
13	110	110	92	---	---	---
14	105	112	94	118	105	118
15	130	126	108	130	---	---
16	115	118	128	---	---	---
17	120	(111)	92	90	104	104
18	105	110	90	92	104	78
19	100	98	85	120	90	100
20	100	90	95	---	---	---
21	100	100	90	112	110	104
22	118	102	100	120	106	105
90	110	100	120	126	108	105
91	118	92	110	118	105	100
92	100	90	85	104	86	90

TABLE AII.229

STANDING SYSTOLIC BLOOD PRESSURE: FLIGHT 2
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	105	118	94	108	110	120
24	115	108	95	92	---	---
25	98	108	96	80	98	104
26	92	90	85	78	78	84
27	95	90	88	78	92	90
28	112	108	108	90	92	102
29	114	110	96	78	110	106
30	(103)	122	100	95	110	106
31	112	118	105	122	128	120
32	95	98	90	78	106	96
33	108	98	110	88	96	96
34	105	80	85	76	106	85

TABLE AII.229 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	104	100	90	95	96	100
36	95	94	108	106	102	108
37	88	112	100	114	94	104
38	88	106	110	108	104	106
39	(103)	100	114	97	---	---
40	100	(103)	---	118	96	104
41	108	105	---	---	---	104
42	130	106	96	110	100	112
43	(103)	94	94	94	92	92
44	95	95	94	100	85	86
93	116	---	---	---	---	---
94	105	95	94	128	95	106
95	125	108	106	110	100	124
102	---	---	---	120	116	116

TABLE AII.230

STANDING SYSTOLIC BLOOD PRESSURE: FLIGHT 3
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	118	100	84	---	93	105
46	110	130	85	84	113	116
47	128	140	114	95	102	126
48	120	134	115	102	122	126
49	104	98	80	98	80	84
50	86	110	86	98	93	110
51	118	110	96	102	103	103
52	112	120	105	100	98	115
53	118	120	108	108	97	106
54	118	110	90	88	108	96
55	102	98	92	88	98	84
56	85	120	118	80	124	109
57	104	108	102	97	118	106
58	114	84	---	95	98	95
59	(108)	(111)	126	126	116	120
60	98	106	104	100	116	105
61	108	110	94	98	110	104
62	105	103	92	96	100	98
63	104	98	94	103	108	96
64	115	103	102	95	118	114
65	114	122	110	94	114	112
66	88	108	118	94	124	108
96	118	112	118	115	110	108
97	114	108	128	105	110	120
98	98	96	102	108	112	102

TABLE AII.231

STANDING SYSTOLIC BLOOD PRESSURE: FLIGHT 4
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	105	110	92	75	104	112
68	102	114	82	94	96	---
69	105	94	96	94	98	103
70	93	100	90	80	94	96
71	116	106	100	106	130	124
72	95	112	96	90	96	114
73	112	112	110	93	----	---
74	142	110	128	120	126	126
75	112	110	108	96	104	110
76	100	108	93	96	104	105
77	100	100	---	---	---	---
78	85	108	97	83	86	88
79	108	100	100	80	90	100
80	94	98	75	78	88	102
81	98	98	110	105	100	108
82	(106)	96	108	---	---	112
83	98	88	92	83	98	102
84	115	106	73	92	92	108
85	115	100	115	96	106	108
86	102	103	103	94	108	110
87	110	103	---	---	---	112
88	125	105	---	---	---	---
99	120	88	112	92	105	100
100	103	100	110	108	112	98
101	105	100	93	98	104	94

TABLE AII.232

STANDING INCREMENT OF SYSTOLIC BLOOD PRESSURE: FLIGHT 1
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	8	18	2	+2	7	2
2	-12	-18	---	---	---	-6
3	8	-12	-22	-2	-28	-5
4	16	10	0	2	-16	-10
5	6	20	10	---	---	6
6	-2	28	12	0	-16	17
7	2	10	-6	0	-3	-8
8	15	2	12	0	-8	-7
9	19	-10	-30	4	-4	6
10	11	20	-14	4	-10	-18
11	5	-20	-39	0	-16	18
12	11	-4	-11	2	-20	-14

TABLE AII.232 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	3	0	-18	---	---	---
14	15	-10	-16	-2	-3	2
15	34	8	-12	10	---	---
16	-9	18	18	---	---	---
17	-10	(5)	16	-40	4	-14
18	-21	20	-32	-28	-22	-24
19	-12	4	-25	6	-14	-20
20	-26	-32	5	---	---	---
21	-26	40	-2	-14	6	-6
22	-2	18	-2	2	14	1
90	-12	-22	-6	14	-12	-5
91	0	2	2	8	5	-10
92	-26	-10	-5	-6	-16	-26

TABLE AII.233

STANDING INCREMENT OF SYSTOLIC BLOOD PRESSURE: FLIGHT 2
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	-15	-2	-14	-6	0	-4
24	5	2	3	-22	---	---
25	-2	4	-16	-34	-10	-6
26	-8	-20	-13	-12	-4	-12
27	5	-10	-12	-18	2	2
28	2	-20	-2	-18	-30	-4
29	4	6	-2	-15	14	2
30	(-3)	12	-12	-2	2	-2
31	2	6	-45	-32	18	-4
32	-5	0	-3	-16	16	2
33	-10	-12	-10	-52	-22	-2
34	-29	-46	-45	-21	2	-23
35	-2	-22	-2	18	-10	-12
36	-12	10	8	6	-12	4
37	-16	14	8	-2	-14	-8
38	-26	-9	0	-23	-4	8
39	(-3)	5	4	-23	---	---
40	10	(-4)	---	8	-18	-12
41	14	0	---	---	---	-8
42	28	6	-8	-2	-8	14
43	(-3)	8	4	-4	-4	-6
44	5	-5	2	-8	-19	-26
93	20	---	---	---	---	---
94	-13	-33	-18	-4	-17	-12
95	-7	-22	-12	-10	-18	8
102	---	---	---	8	-6	4

TABLE AII.234

STANDING INCREMENT OF SYSTOLIC BLOOD PRESSURE: FLIGHT 3
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	8	12	-18	---	-3	3
46	0	22	-17	-6	-3	4
47	10	28	12	-13	-14	10
48	-20	9	3	-10	18	12
49	14	10	-14	8	-28	-10
50	-24	10	-8	-6	-5	8
51	10	5	-6	4	-15	-13
52	0	-5	-13	-42	-4	-3
53	16	14	-6	10	-15	2
54	-2	8	-16	-4	12	-16
55	-8	-6	-18	-6	-6	-6
56	-9	8	8	-18	16	-9
57	-11	4	-7	-11	20	0
58	-6	-38	---	-13	-24	-11
59	(-4)	(4)	-4	4	4	0
60	-10	2	0	-8	24	3
61	-12	20	-10	-12	-6	-10
62	11	3	-14	6	0	-6
63	-42	-4	-36	5	-4	-12
64	5	-19	-16	-23	-4	8
65	34	10	8	-4	6	20
66	-42	-4	6	-8	26	-8
96	4	-6	-20	19	6	-14
97	-6	-22	14	7	-12	16
98	-17	-24	0	6	10	12

TABLE AII.235

STANDING INCREMENT OF SYSTOLIC BLOOD PRESSURE: FLIGHT 4
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	-13	10	-18	-43	-14	4
68	-3	-1	-40	-10	-18	---
69	-20	-1	-6	-14	8	7
70	-15	10	-2	-16	-18	10
71	-2	-9	-22	-10	32	-4
72	-29	4	-24	-22	6	2
73	17	-6	-10	-21	---	---
74	-3	-22	14	12	20	-2
75	2	12	-20	-24	8	0
76	-8	4	-25	-8	-14	-1
77	0	-10	---	---	---	---
78	-5	20	-3	-21	-14	-10

TABLE AII.235 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	4	2	0	-18	2	-12
80	0	12	-17	-32	-16	-6
81	2	12	10	-9	-2	0
82	(-3)	-14	-30	---	---	6
83	-6	-12	4	-5	-14	-12
84	17	6	-19	-2	-12	6
85	-1	-6	5	2	-2	-18
86	2	-7	-9	-8	12	-12
87	-6	-57	---	---	---	-6
88	9	-3	---	---	---	---
99	20	2	4	4	-1	-16
100	-15	0	-2	4	-10	-8
101	-15	-10	-19	-6	8	-16

TABLE AII.236

LYING DIASTOLIC BLOOD PRESSURE: FLIGHT 1
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	68	65	70	50	66	68
2	74	62	--	--	--	62
3	54	68	78	60	58	68
4	74	56	84	56	58	52
5	54	50	70	--	--	72
6	80	74	72	54	60	76
7	73	50	70	56	56	68
8	56	65	58	60	50	68
9	68	60	88	58	60	80
10	60	78	72	66	56	54
11	69	58	90	72	54	48
12	56	86	72	66	56	66
13	82	60	60	--	--	--
14	64	90	68	80	64	82
15	74	90	58	48	68	--
16	62	74	64	--	--	--
17	76	(68)	48	76	62	72
18	70	68	66	64	70	46
19	58	60	64	58	60	64
20	70	80	68	--	--	--
21	74	50	72	70	68	78
22	72	84	46	62	38	72
90	66	90	60	64	76	62
91	72	50	64	60	62	58
92	72	70	64	40	52	56

TABLE AII.237

LYING DIASTOLIC BLOOD PRESSURE: FLIGHT 2
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	60	50	76	60	48	58
24	74	68	67	76	--	--
25	60	58	72	68	64	74
26	55	68	60	60	10	36
27	50	34	63	40	0	58
28	65	86	58	78	62	78
29	50	54	76	18	64	62
30	(63)	66	72	68	78	78
31	55	60	66	62	70	48
32	50	54	56	62	65	68
33	60	60	64	60	63	34
34	76	74	0	66	76	62
35	64	78	58	60	64	60
36	86	64	0	46	82	58
37	74	64	62	68	40	62
38	74	58	40	0	56	54
39	66	58	70	70	--	--
40	54	(63)	--	40	58	70
41	58	63	--	--	--	62
42	66	78	58	62	20	50
43	58	64	56	54	28	64
44	60	58	54	56	58	60
93	72	--	--	--	--	--
94	67	64	0	54	58	58
95	86	90	72	80	70	54
102	--	--	--	36	44	56

TABLE AII.238

LYING DIASTOLIC BLOOD PRESSURE: FLIGHT 3
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	70	50	64	76	52	66
46	60	55	46	62	72	54
47	78	90	56	64	72	74
48	94	75	50	76	60	72
49	64	55	64	68	52	60
50	68	60	62	80	60	66
51	68	60	56	66	64	62
52	88	95	102	80	70	96
53	74	82	48	62	62	54
54	78	80	72	64	58	60
55	70	70	50	48	58	58
56	56	68	46	60	54	68

TABLE AII.238 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	78	80	56	78	52	66
58	86	92	--	72	80	70
59	(73)	(68)	70	68	98	76
60	72	60	48	58	50	48
61	85	30	68	76	56	68
62	60	0	54	50	54	64
63	65	84	66	62	62	78
64	86	100	74	66	68	72
65	60	70	68	72	60	72
66	78	74	54	68	52	62
96	80	84	56	66	64	80
97	82	94	50	52	66	60
98	76	74	58	62	60	56

TABLE AII.239

LYING DIASTOLIC BLOOD PRESSURE: FLIGHT 4
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	70	57	0	62	58	58
68	70	65	0	50	54	--
69	80	58	72	54	56	30
70	70	60	66	64	60	58
71	77	72	84	58	64	62
72	84	70	76	60	54	68
73	50	58	64	60	--	--
74	80	88	64	68	58	66
75	70	60	70	68	56	64
76	80	60	44	55	70	70
77	50	62	--	--	--	--
78	68	53	44	78	58	52
79	58	58	54	62	54	64
80	68	54	54	86	70	64
81	68	55	60	76	70	56
82	(70)	60	28	--	--	42
83	74	34	56	60	66	70
84	58	62	56	68	60	68
85	70	28	74	62	56	48
86	56	50	42	48	52	58
87	90	80	--	--	--	76
88	70	75	--	--	--	--
99	76	64	66	52	52	64
100	74	55	78	62	70	64
101	68	62	54	58	68	64

TABLE AII.240

STANDING DIASTOLIC BLOOD PRESSURE: FLIGHT 1
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	84	90	76	100	78	88
2	78	80	--	--	--	80
3	70	64	64	60	64	85
4	72	70	64	56	58	66
5	60	90	72	--	--	84
6	85	84	90	86	86	90
7	80	80	68	78	78	85
8	75	78	80	62	75	80
9	85	80	82	68	86	95
10	70	78	60	62	70	74
11	80	68	68	70	70	70
12	70	70	80	70	67	78
13	70	86	75	--	--	--
14	75	95	80	90	85	96
15	95	84	84	90	--	--
16	80	84	86	--	--	--
17	75	(79)	66	60	85	79
18	90	80	74	68	76	66
19	85	74	64	68	76	82
20	75	80	74	--	--	--
21	85	80	80	98	90	90
22	80	68	76	88	97	98
90	90	70	96	88	84	84
91	85	72	74	76	86	82
92	85	60	75	68	72	84

TABLE AII.241

STANDING DIASTOLIC BLOOD PRESSURE: FLIGHT 2
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	90	76	76	68	68	68
24	95	68	90	80	--	--
25	82	68	90	62	70	73
26	72	60	70	64	42	54
27	75	64	80	72	56	80
28	88	78	94	68	64	78
29	74	70	75	66	74	85
30	(80)	88	84	80	78	85
31	90	70	70	78	66	80
32	75	70	75	62	68	80
33	88	70	78	68	60	68
34	75	68	78	66	74	72

TABLE AII.241 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	84	60	70	76	60	84
36	76	72	74	68	76	84
37	72	80	70	80	78	90
38	66	60	74	50	50	78
39	(80)	69	58	68	--	--
40	68	(72)	--	56	68	86
41	85	85	--	--	--	86
42	96	74	74	58	73	70
43	(80)	75	75	66	76	78
44	75	80	70	66	74	68
93	78	--	--	--	--	--
94	86	80	46	80	78	78
95	90	95	82	80	80	96
102	--	--	--	60	84	80

TABLE AII.242

STANDING DIASTOLIC BLOOD PRESSURE: FLIGHT 3
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	80	70	75	--	86	92
46	78	80	53	78	85	84
47	84	90	74	68	86	88
48	90	90	68	74	84	88
49	68	60	70	62	65	60
50	60	76	78	72	78	80
51	90	80	76	74	84	78
52	90	90	100	95	84	105
53	70	76	70	64	69	78
54	78	72	75	70	85	80
55	74	66	56	70	64	70
56	64	68	74	0	72	82
57	86	74	60	83	88	80
58	76	73	--	90	66	76
59	(79)	(77)	80	95	78	92
60	74	75	66	78	68	65
61	93	70	72	92	80	78
62	84	80	70	75	75	52
63	77	72	74	86	56	68
64	88	87	88	78	96	88
65	90	86	66	90	80	72
66	60	78	60	86	72	78
96	78	86	80	93	70	98
97	82	64	78	78	85	88
98	66	70	75	82	68	76

TABLE AII.243

STANDING DIASTOLIC BLOOD PRESSURE: FLIGHT 4
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	82	64	72	58	56	65
68	72	54	60	64	58	--
69	75	58	56	70	56	80
70	65	68	50	58	70	72
71	86	80	84	83	106	86
72	70	66	66	73	85	80
73	60	70	78	73	--	--
74	105	84	76	95	100	94
75	85	90	60	75	86	88
76	65	66	75	86	93	76
77	60	68	--	--	--	--
78	65	64	90	68	73	76
79	64	60	65	60	72	62
80	70	60	66	68	80	79
81	70	64	82	75	68	86
82	(70)	85	76	--	--	90
83	82	74	78	65	74	85
84	84	86	30	52	68	85
85	85	80	88	78	88	84
86	0	80	0	58	82	76
87	90	78	--	--	--	82
88	45	68	--	--	--	--
99	80	74	85	58	86	72
100	85	74	79	78	80	74
101	90	85	88	72	80	76

TABLE AII.244

STANDING INCREMENT OF DIASTOLIC PRESSURE: FLIGHT 1
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	16	25	6	27	12	20
2	4	18	---	---	---	8
3	16	-4	-14	0	6	17
4	-2	14	-20	0	0	14
5	6	40	2	---	---	12
6	5	10	18	32	26	14
7	7	30	-2	22	22	17
8	19	13	22	2	25	-14
9	17	20	-6	10	26	15
10	10	00	-12	-4	14	20
11	11	10	-22	-2	16	22
12	14	-16	8	4	11	12

TABLE AII.244 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	-12	26	15	---	---	---
14	11	5	12	10	21	14
15	21	-6	26	42	---	---
16	18	10	22	---	---	---
17	-1	(13)	18	-16	23	7
18	20	12	8	42	6	20
19	27	14	0	10	16	18
20	5	0	6	---	---	---
21	11	30	8	28	22	12
22	8	16	30	26	59	26
90	24	-20	36	24	8	22
91	13	22	10	16	24	24
92	13	-10	11	28	20	28

TABLE AII.245

STANDING INCREMENT OF DIASTOLIC PRESSURE: FLIGHT 2
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	30	26	0	8	20	10
24	21	0	23	4	---	---
25	22	10	18	-6	6	-1
26	17	-8	10	4	32	18
27	25	30	17	32	56	22
28	23	-8	36	-10	-2	0
29	24	16	-1	12	10	23
30	(18)	22	12	16	0	7
31	35	10	4	0	-4	32
32	25	16	19	8	3	12
33	28	16	14	0	-3	34
34	-1	-6	78	16	-2	10
35	20	-18	-12	22	-4	24
36	-10	8	74	12	-6	26
37	-2	16	8	50	38	28
38	-8	2	34	-2	-6	24
39	(18)	11	-12	-2	---	---
40	14	---	---	16	10	16
41	27	22	---	---	---	24
42	30	-4	16	-4	53	20
43	(18)	11	19	12	48	14
44	15	22	16	10	16	8
93	6	---	---	---	---	---
94	19	16	46	26	20	20
95	4	5	10	0	10	42
102	---	---	---	24	40	24

TABLE AII.246

STANDING INCREMENT OF DIASTOLIC PRESSURE: FLIGHT 3
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	10	20	11	---	34	26
46	18	25	-7	16	13	30
47	6	0	18	4	14	14
48	-9	15	18	-2	24	16
49	4	5	6	-6	13	0
50	-8	16	16	-8	18	14
51	22	20	20	8	20	16
52	2	-5	-2	15	14	9
53	-4	-6	22	2	-7	24
54	0	-8	3	6	27	20
55	4	-4	6	22	6	12
56	8	0	28	-60	18	14
57	8	-6	4	13	36	14
58	-10	-19	---	18	-14	6
59	(5)	(9)	10	27	20	16
60	2	15	18	20	18	17
61	8	40	4	16	24	10
62	24	80	16	25	21	-12
63	12	-12	8	24	-6	-10
64	2	-13	14	12	28	16
65	30	16	-2	18	20	0
66	-18	4	6	18	20	16
96	-2	2	24	27	6	18
97	0	-30	28	26	19	28
98	-10	-4	17	20	8	20

TABLE AII.247

STANDING INCREMENT OF DIASTOLIC PRESSURE: FLIGHT 4
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	12	7	72	-4	-2	7
68	2	-11	60	14	4	---
69	-5	0	-16	16	0	50
70	-5	8	-16	-6	10	14
71	9	8	0	25	42	24
72	-14	-4	-10	13	31	12
73	10	12	-14	13	---	---
74	25	-4	12	27	42	28
75	15	30	-10	7	30	24
76	-15	6	31	31	23	6
77	10	6	---	---	---	---
78	-3	11	46	-10	15	24

TABLE AII.247 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	6	2	11	-2	18	-2
80	2	6	12	-18	10	15
81	2	9	22	-1	-2	30
82	(+1)	25	40	---	---	32
83	8	40	22	5	8	15
84	26	24	-26	-16	8	17
85	15	52	14	16	32	36
86	-56	30	-42	10	30	18
87	0	-2	---	---	---	6
88	-25	-7	---	---	---	---
99	4	10	19	6	34	8
100	11	19	1	16	10	10
101	22	23	34	14	12	12

TABLE AII.248

LYING PULSE PRESSURE: FLIGHT 1
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	42	45	40	50	42	42
2	48	56	--	--	--	42
3	50	44	30	50	54	42
4	20	44	26	38	46	46
5	50	60	30	--	--	36
6	32	38	26	62	72	42
7	27	40	30	50	40	40
8	34	43	40	52	62	46
9	38	70	42	66	52	44
10	34	32	32	54	54	52
11	41	62	32	44	56	62
12	38	24	36	58	52	44
13	25	50	50	--	--	--
14	26	32	42	40	44	34
15	22	28	62	72	62	--
16	62	26	46	--	--	--
17	54	(40)	60	54	38	46
18	56	22	56	56	56	56
19	54	34	46	56	44	56
20	56	42	22	--	--	--
21	52	10	20	56	36	32
22	48	36	56	56	54	32
90	56	32	66	48	44	48
91	46	40	44	50	38	52
92	54	30	26	70	50	60

TABLE AII.249

LYING PULSE PRESSURE: FLIGHT 2
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	60	70	32	54	62	66
24	36	38	25	38	--	--
25	40	46	40	46	44	36
26	45	42	38	30	72	60
27	40	66	37	56	90	30
28	45	42	52	30	60	28
29	60	50	22	78	32	42
30	(43)	44	40	42	30	30
31	55	52	84	62	40	76
32	50	44	37	48	25	26
33	58	56	56	44	55	64
34	58	52	130	62	28	46
35	42	44	34	56	42	52
36	21	20	100	42	32	46
37	30	34	30	40	68	50
38	40	57	70	110	52	44
39	36	37	40	50	--	--
40	36	(44)	--	70	56	46
41	36	42	--	--	--	50
42	36	22	46	50	88	48
43	38	22	34	44	68	44
44	30	42	38	52	46	52
93	24	--	--	--	--	--
94	51	64	112	78	54	60
95	46	40	46	40	48	62
102	--	--	--	76	78	56

TABLE AII.250

LYING PULSE PRESSURE: FLIGHT 3
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	40	38	38	14	44	36
46	50	53	56	28	44	66
47	40	22	46	44	44	42
48	46	50	62	36	44	42
49	26	33	30	22	56	34
50	42	40	32	24	38	36
51	40	45	46	32	54	54
52	24	30	16	62	32	22
53	28	24	66	36	50	50
54	42	22	34	28	38	52
55	40	34	60	46	46	32

TABLE AII.250 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
56	38	44	64	38	54	50
57	37	24	53	38	46	40
58	34	30	--	36	42	36
59	(39)	(39)	60	54	54	44
60	36	44	56	50	42	60
61	35	60	36	34	60	46
62	34	100	52	40	46	40
63	81	18	64	36	50	30
64	24	22	44	52	54	34
65	20	42	34	26	48	20
66	52	38	58	34	46	54
96	34	34	82	30	40	42
97	38	36	64	46	56	44
98	39	46	44	40	42	58

TABLE AII.251

LYING PULSE PRESSURE: FLIGHT 4
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	48	43	110	56	60	50
68	35	50	122	54	60	--
69	45	37	30	54	34	66
70	38	30	26	32	52	28
71	41	43	38	58	34	66
72	40	38	44	52	36	44
73	45	60	56	54	--	--
74	65	44	50	40	48	62
75	40	38	58	52	40	46
76	28	44	74	49	48	36
77	50	48	--	--	--	--
78	22	35	56	26	42	46
79	46	40	46	36	34	48
80	26	32	38	24	34	44
81	28	31	40	38	32	52
82	(39)	50	110	--	--	64
83	30	66	32	28	46	44
84	40	38	36	26	44	34
85	46	78	36	32	52	78
86	44	60	70	64	44	64
87	26	80	--	--	--	42
88	46	33	--	--	--	--
99	24	22	42	36	54	52
100	44	45	34	42	52	42
101	52	48	58	48	28	46

TABLE AII.252

STANDING PULSE PRESSURE: FLIGHT 1
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	34	38	36	5	37	24
2	32	20	--	--	--	18
3	42	36	22	48	20	20
4	38	40	46	40	30	22
5	50	40	38	--	--	30
6	25	56	20	30	30	45
7	32	20	26	28	15	15
8	30	32	30	50	29	27
9	40	40	18	60	22	35
10	35	52	30	62	30	14
11	35	32	15	46	24	22
12	35	36	17	56	21	18
13	40	24	17	--	--	--
14	30	17	14	28	20	22
15	35	42	24	40	--	--
16	35	32	42	--	--	--
17	45	(32)	26	30	19	25
18	15	30	16	24	28	12
19	15	24	21	52	14	18
20	25	10	21	--	--	--
21	15	20	10	14	20	14
22	38	34	24	32	9	7
90	20	30	24	38	24	21
91	33	20	88	42	19	18
92	15	30	10	36	14	6

TABLE AII.253

STANDING PULSE PRESSURE: FLIGHT 2
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	15	40	18	40	42	52
24	20	40	5	12	--	--
25	16	40	6	18	28	31
26	20	30	15	14	36	30
27	20	26	8	6	36	10
28	24	30	14	22	28	24
29	40	40	21	12	36	21
30	(23)	34	16	15	32	21
31	22	48	35	44	62	40
32	20	28	15	16	38	16
33	20	28	32	20	36	28
34	30	12	7	10	32	13

TABLE AII.253 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	20	40	20	19	36	16
36	19	22	34	38	26	24
37	16	32	30	34	16	14
38	22	46	36	58	54	28
39	(23)	31	56	29	--	--
40	32	(31)	--	62	28	18
41	23	20	--	--	--	18
42	34	32	22	52	27	42
43	(23)	19	19	28	16	14
44	20	15	24	34	11	18
93	38	--	--	--	--	--
94	19	15	48	48	17	28
95	35	13	24	30	20	28
102	--	--	--	60	32	36

TABLE AII.254

STANDING PULSE PRESSURE: FLIGHT 3
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	38	30	9	--	7	13
46	32	50	32	6	28	32
47	44	50	40	27	16	38
48	30	44	47	28	38	38
49	36	38	10	36	15	24
50	26	34	8	26	15	30
51	28	30	20	28	19	25
52	22	30	5	5	14	10
53	48	44	38	44	28	28
54	40	38	15	18	23	16
55	28	32	36	18	34	14
56	21	52	44	80	52	27
57	18	34	42	14	30	26
58	38	11	--	5	32	19
59	(29)	(34)	46	31	38	28
60	24	31	38	22	48	40
61	15	40	22	6	30	26
62	21	23	22	21	25	46
63	27	26	20	17	52	28
64	27	16	14	17	22	26
65	24	36	44	4	34	40
66	28	30	58	8	52	30
96	40	26	30	22	40	10
97	32	44	50	27	25	32
98	32	26	27	26	44	26

TABLE AII.255

STANDING PULSE PRESSURE: FLIGHT 4
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	23	46	20	17	48	47
68	30	60	22	30	38	--
69	30	36	40	24	42	23
70	28	32	40	22	24	24
71	30	26	16	24	24	38
72	25	46	30	17	11	34
73	52	42	32	20	--	--
74	37	26	52	25	26	32
75	27	20	48	21	18	22
76	35	42	18	10	11	29
77	40	32	--	--	--	--
78	20	44	7	15	13	12
79	44	40	35	20	18	38
80	24	38	9	10	8	23
81	28	34	28	30	32	22
82	(36)	11	32	--	--	22
83	16	14	14	18	24	17
84	31	20	43	40	24	23
85	30	20	27	18	18	24
86	102	23	103	36	26	34
87	20	25	--	--	--	30
88	80	37	--	--	--	--
99	40	14	27	34	19	28
100	18	26	31	30	32	24
101	15	15	5	26	24	18

TABLE AII.256

STANDING INCREMENT OF PULSE PRESSURE: FLIGHT 1
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	-8	-7	-4	-25	-5	-18
2	-16	-36	---	---	---	-14
3	-8	-8	-8	-2	-34	-22
4	18	-4	20	2	-16	-24
5	0	-20	8	---	---	-6
6	7	18	-6	-32	-42	3
7	5	-20	-4	-22	-25	-25
8	-4	-11	-10	-2	-23	-19
9	2	-30	-24	-6	-30	-9
10	1	20	-2	8	-24	-38
11	-6	-30	-17	2	-32	-40
12	-3	12	-19	-2	-31	-26

TABLE AII.256 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	15	-26	-33	---	---	---
14	4	-15	-28	-12	-24	-12
15	13	14	-38	-32	---	---
16	-27	8	-4	---	---	---
17	-9	(-8)	-34	-24	-19	-21
18	-41	8	-40	-32	-28	-44
19	-39	-10	-25	-4	-30	-38
20	-31	-32	-1	---	---	---
21	-37	10	-10	-42	-16	-18
22	-10	2	-32	-24	-45	-25
90	-36	-2	-42	-10	-20	-27
91	-13	-20	-8	-8	-19	-34
92	-39	0	-16	-34	-36	54

TABLE AII.257

STANDING INCREMENT OF PULSE PRESSURE: FLIGHT 2
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	-45	-28	-14	-14	-20	-14
24	-16	2	-20	-26	---	---
25	-24	-6	-34	-28	-16	-5
26	-25	-12	-23	-16	-36	-30
27	-20	-40	-29	-50	-54	-20
28	-21	-12	-38	-8	-32	-4
29	-20	-10	-1	-27	4	-21
30	(-8)	-10	-24	-18	2	-9
31	-33	-4	-49	-32	22	-36
32	-30	-16	-22	-24	13	-10
33	-38	-28	-24	-52	-19	-36
34	-28	-40	-123	37	4	-23
35	22	-4	-14	-4	-6	-36
36	-2	2	-66	-6	-6	-22
37	-14	-2	0	-52	-52	-36
38	-18	-11	-34	-21	-2	-16
39	(-18)	-6	16	-21	---	---
40	-4	(-12)	---	-8	-28	-28
41	-13	-22	---	---	---	-32
42	-2	10	-24	2	-61	-8
43	(-18)	-3	-15	-16	-52	-30
44	-10	-27	-14	-18	-35	-34
93	14	---	---	---	---	---
94	-32	-49	-64	-30	-37	-32
95	-11	-27	-22	-10	-28	-34
102	---	---	---	-16	-46	-20

TABLE AII.258

STANDING INCREMENT OF PULSE PRESSURE: FLIGHT 3
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	-2	-8	-9	---	-37	-23
46	-18	-3	-24	-22	-16	-34
47	4	28	-6	-17	-28	-4
48	-16	-6	-15	-6	-6	-4
49	10	5	-20	14	-41	-10
50	-16	-6	-24	2	-23	-6
51	-12	-15	-26	-4	-35	-29
52	-2	0	-11	-57	-18	-12
53	20	20	-28	8	-22	-22
54	-2	16	-19	-10	-15	-36
55	-12	-2	-24	28	-12	-18
56	-17	8	-20	-42	-2	-23
57	-19	10	-11	-24	-16	-14
58	4	-19	---	-31	-10	-17
59	(-7)	(-14)	-14	-23	-16	-16
60	-12	-13	-18	-28	6	-20
61	-20	-20	-14	-28	-30	-20
62	-13	-77	-38	-19	-21	-18
63	-5	8	-44	-19	2	-2
64	3	-6	-30	-35	-32	-8
65	4	-6	10	-22	-14	20
66	-24	-8	0	26	6	-24
96	6	-8	-44	-8	0	-32
97	-6	8	-14	-19	-31	-12
98	7	-20	-17	-14	2	-32

TABLE AII.259

STANDING INCREMENT OF PULSE PRESSURE: FLIGHT 4
(mm Hg)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	-25	3	-90	-39	-12	-3
68	-5	10	-100	-24	-22	---
69	-15	-1	10	-30	8	-43
70	-10	2	14	-10	-28	-4
71	-11	-17	-22	-35	-10	-28
72	-15	8	-14	-35	-25	-10
73	7	-18	-24	-34	---	---
74	-28	-18	2	-15	-22	-30
75	-13	-18	-10	-31	-22	-24
76	7	-2	-56	-39	-37	-7
77	-10	-16	---	---	---	---
78	-2	9	-49	-11	-29	-34

TABLE AII.259 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	-2	0	-11	-16	-16	-10
80	-2	6	-29	-14	-26	-21
81	0	3	-12	-8	0	-30
82	(-4)	-39	-78	---	---	-32
83	-14	-52	-18	-10	-22	-27
84	-9	-18	7	14	-20	-11
85	-16	-58	-9	-14	-34	-54
86	58	-37	33	-18	-18	-30
87	-6	-55	---	---	---	-12
88	34	4	---	---	---	---
99	16	-8	-15	-2	-35	-24
100	-26	-19	-3	-12	-20	-18
101	-37	-33	-53	-22	-4	-28

TABLE AII.260

LYING PULSE RATE: FLIGHT 1
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	68	48	56	48	56	70
2	58	52	--	--	--	66
3	54	52	48	64	70	68
4	74	52	60	58	66	74
5	54	60	60	--	--	62
6	80	56	64	50	66	58
7	73	52	48	56	76	70
8	56	48	52	82	56	74
9	52	56	56	58	64	62
10	52	56	48	76	36	56
11	56	52	48	56	66	68
12	60	64	56	72	82	74
13	52	56	52	--	--	--
14	68	68	56	62	72	62
15	58	54	42	56	--	--
16	54	70	50	--	--	--
17	64	(60)	50	52	82	66
18	56	74	52	58	74	62
19	64	78	50	62	74	76
20	62	68	54	--	--	--
21	60	72	56	78	70	64
22	52	76	56	60	62	58
90	58	66	60	62	58	54
91	56	68	48	80	74	62
92	50	72	50	64	76	60

TABLE AII.261

LYING PULSE RATE: FLIGHT 2
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	56	54	54	52	48	50
24	56	76	60	56	--	--
25	64	68	60	60	56	66
26	56	68	60	54	48	52
27	60	72	52	58	46	60
28	72	76	54	56	48	64
29	52	64	44	54	46	56
30	(59)	68	52	56	50	56
31	44	48	52	56	54	58
32	64	60	52	56	52	60
33	52	60	46	54	52	54
34	60	60	68	62	58	60
35	64	64	54	52	54	68
36	56	76	62	56	68	50
37	64	64	54	60	56	64
38	64	60	48	56	50	62
39	48	52	50	54	--	--
40	56	(64)	--	74	76	64
41	56	60	--	--	--	--
42	56	64	58	72	50	58
43	76	66	64	54	54	72
44	60	66	60	74	62	68
93	56	--	--	--	--	--
94	68	84	62	60	80	60
95	72	76	64	80	58	64
102	--	--	--	54	72	60

TABLE AII.262

LYING PULSE RATE: FLIGHT 3
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	48	52	44	40	56	56
46	68	64	46	52	52	56
47	52	56	50	48	60	48
48	64	60	52	56	64	54
49	68	64	46	56	58	64
50	64	78	68	60	64	76
51	56	44	46	52	54	58
52	56	72	60	80	64	76
53	56	52	54	60	62	54
54	64	56	54	60	64	52
55	64	64	58	44	54	58
56	64	54	56	54	62	60

TABLE AII.265 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	72	92	96	88	90	74
36	68	76	74	90	76	76
37	72	72	76	90	84	76
38	64	76	84	78	88	66
39	(60)	68	78	108	--	--
40	76	(81)	--	58	64	72
41	80	60	--	--	--	--
42	68	72	72	76	70	78
43	(88)	68	96	60	68	86
44	84	72	106	100	94	126
93	88	--	--	--	--	--
94	76	80	98	90	80	92
95	60	76	76	82	74	80
102	--	--	--	84	72	72

TABLE AII.266

STANDING PULSE RATE: FLIGHT 3
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	84	80	112	133	108	94
46	80	80	88	84	68	82
47	72	80	84	112	72	72
48	88	76	100	80	76	66
49	108	80	88	68	88	80
50	64	88	92	68	108	92
51	68	72	88	80	100	94
52	72	76	92	98	84	96
53	54	52	64	74	76	62
54	68	84	104	76	100	82
55	92	84	92	52	74	84
56	64	60	88	80	70	72
57	64	64	66	80	76	64
58	68	104	--	80	64	82
59	(73)	(74)	66	68	60	66
60	76	72	86	84	74	68
61	64	68	72	80	60	66
62	68	62	78	80	76	90
63	84	76	62	92	62	84
64	60	56	72	88	76	82
65	64	72	76	96	92	96
66	68	72	68	92	68	90
96	64	68	76	80	62	96
97	68	78	62	80	72	72
98	76	86	80	88	74	92

TABLE AII.267

STANDING PULSE RATE: FLIGHT 4
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	88	84	84	112	78	80
68	72	76	84	68	90	--
69	68	72	72	74	68	82
70	68	68	80	76	84	90
71	76	80	76	64	68	96
72	80	88	68	74	82	80
73	72	84	80	70	--	--
74	96	100	84	108	94	96
75	72	96	68	86	88	84
76	100	112	100	84	82	94
77	82	112	--	--	--	--
78	72	80	64	86	72	66
79	60	68	64	100	72	88
80	76	80	68	84	76	72
81	68	72	50	66	72	64
82	(73)	80	100	--	--	98
83	68	72	90	88	92	96
84	64	80	72	88	78	90
85	60	92	88	96	94	88
86	68	88	62	88	88	78
87	72	76	--	--	--	86
88	64	80	--	--	--	--
99	60	68	50	48	62	58
100	68	76	56	60	72	64
101	76	80	96	92	116	110

TABLE AII.268

STANDING INCREMENT OF PULSE RATE: FLIGHT 1
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	16	16	28	40	16	-8
2	22	20	--	--	--	12
3	16	12	24	32	6	-10
4	-2	28	32	22	2	10
5	6	4	8	--	--	-2
6	5	8	-4	28	14	42
7	7	16	4	24	0	-4
8	19	16	24	6	20	-14
9	24	20	36	8	20	14
10	20	12	24	2	12	32
11	16	28	36	8	2	0
12	20	20	36	4	10	12

TABLE AII.268 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	18	28	28	--	--	--
14	18	16	8	34	4	16
15	2	10	30	36	--	--
16	42	6	22	--	--	--
17	12	(24)	30	34	-14	-2
18	78	42	16	42	22	42
19	24	0	26	22	6	4
20	36	18	26	--	--	--
21	56	16	48	30	34	22
22	66	2	12	42	26	24
90	48	22	32	38	22	28
91	28	8	40	4	18	26
92	26	12	30	28	0	26

TABLE AII.269

STANDING INCREMENT OF PULSE RATE: FLIGHT 2
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0	18	54	44	14	24
24	4	20	32	26	--	--
25	4	32	52	44	30	38
26	16	28	32	40	36	24
27	28	32	40	38	42	36
28	16	28	38	26	38	18
29	16	4	28	14	20	8
30	(12)	28	24	52	28	12
31	8	16	52	8	12	14
32	4	8	28	42	26	24
33	0	24	18	18	20	10
34	28	36	40	42	24	34
35	8	28	42	36	36	6
36	12	0	12	34	8	26
37	8	8	22	30	28	12
38	0	16	36	32	38	4
39	(12)	16	28	54	--	--
40	20	(17)	--	-16	-8	8
41	24	0	--	--	--	--
42	12	8	14	4	20	20
43	(12)	2	32	6	14	14
44	24	6	46	36	32	58
93	32	--	--	--	--	--
94	8	-4	36	30	0	32
95	-12	0	12	2	16	16
102	--	--	--	30	0	12

TABLE AII.270

STANDING INCREMENT OF PULSE RATE: FLIGHT 3
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	36	28	68	93	52	38
46	12	16	42	32	16	26
47	20	24	34	64	12	24
48	24	16	48	24	12	12
49	40	16	42	12	30	16
50	0	10	74	8	44	16
51	12	28	42	38	46	36
52	16	4	32	18	20	20
53	-2	0	10	14	14	8
54	4	28	50	16	36	30
55	28	20	34	8	20	26
56	0	6	32	26	8	12
57	16	12	12	20	24	10
58	4	20	--	20	6	18
59	(13)	(15)	18	26	8	10
60	16	24	38	34	18	16
61	8	10	24	36	8	14
62	12	4	30	35	20	38
63	4	22	10	29	4	26
64	12	10	22	38	20	36
65	0	6	12	32	18	24
66	16	20	14	40	6	34
96	4	6	20	24	8	32
97	20	26	10	20	24	20
98	12	26	26	28	6	36

TABLE AII.271

STANDING INCREMENT OF PULSE RATE: FLIGHT 4
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	14	20	26	54	10	18
68	16	6	34	24	36	--
69	12	12	24	30	12	18
70	26	8	28	28	18	32
71	16	8	32	14	6	38
72	20	22	22	22	26	24
73	16	20	24	2	--	--
74	28	36	22	40	26	34
75	24	38	22	34	24	24
76	40	54	36	28	28	26
77	30	62	--	--	--	--
78	20	12	16	38	10	6

TABLE AII.271 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	4	6	14	48	18	32
80	20	22	16	36	12	8
81	6	6	10	24	14	8
82	(15)	24	40	--	--	34
83	0	8	26	32	30	30
84	2	12	14	32	18	12
85	0	16	26	32	32	16
86	8	28	6	32	32	4
87	4	0	--	--	--	26
88	2	16	--	--	--	--
99	2	14	6	0	16	14
100	16	18	12	16	22	0
101	8	10	28	28	56	42

TABLE AII.272

RESTING OXYGEN CONSUMPTION PRE I, FRA SUBJECTS: CALCULATION OF CORRECTION FACTORS

Subject Number	Mean Observed ($ml/O_2/M^2/min$)	Unit Number	Corrected ($ml/M^2/min$)
90	104	1	129
91	199	1	247
92	141	1	175
93	168	3	161
94	232	3	222
95	390*	3	---*
96	145	3	139
97	133	1	165
98	153	1	190
99	118	1	146
100	158	3	151
101	213	3	204

* Subject 95 omitted from calculation because of aberrant results.

	Unit 1	Unit 3
Mean	141	183
Range	104-199	145-232
Factor	$\frac{175}{141} = 1.241$	$\frac{175}{183} = 0.956$

TABLE AII.273

RESTING OXYGEN CONSUMPTION: PRE I, HARD WORK
(Factors: Unit 1 = 1.241; Unit 3 = 0.956)

Diet	Water	Subject	ml/O$_2$/min Run 1	ml/O$_2$/min Run 2	$\bar{X}$	S.A.	ml/O$_2$/M^2/min	Unit No.	Corrected ml/M^2/min	% of PRE II
ST 0	U	1	238	162	200	1.72	116	1	144	79
		2	268	207	245	1.84	133	1	165	109
		3	320	278	299	1.68	177	1	220	134
		4	270	245	257	1.96	131	1	163	73
	L	23	419	421	420	1.94	216	3	206	148
		24	455	311	383	1.58	242	3	231	135
		25	397	435	416	1.80	231	3	221	136
		26	373	306	339	1.58	215	3	205	107
0/100/0 1000	U	5	398	267	333	1.70	196	1	243	164
		6	352	321	337	1.79	188	1	233	139
	L	27	315	395	355	1.55	229	3	219	76
		28	436	544	490	1.70	288	3	275	149
2000	U	7	337	292	315	1.89	166	1	206	130
		8	132	170	151	1.70	88	1	109	66
	L	29	425	406	415	1.92	216	3	206	129
		30	281	324	303	1.80	168	3	161	100
30/0/70 1000	U	9	508	443	475	1.98	239	3	253	158
		10	365	332	349	1.72	202	1	251	129
	L	31	397	468	433	2.04	212	3	203	118
		32	425	352	389	1.74	223	3	213	127
2000	U	11	318	234	276	1.78	155	1	192	123
		12	262	294	278	1.90	146	1	181	106
	L	33	294	350	322	1.78	180	3	172	111
		34	364	392	378	1.68	225	3	215	137
2/20/78 1000	U	13	337	236	287	1.84	155	1	192	140
		14	144	---	144	1.77	81	1	100	59
	L	35	240	475	357	1.72	207	3	198	147
		36	310	359	345	1.75	197	3	188	101
2000	U	15	254	189	221	1.85	119	1	148	110
		16	---	---	---	----	---	-	---	---
	L	37	236	210	223	1.77	125	3	119	93
		38	465	393	429	1.78	241	3	230	132
15/52/33 1000	U	17	217	---	217	1.99	109	1	135	78
		18	333	---	333	1.72	193	1	239	158
	L	39	298	---	298	1.66	179	3	171	101
		40	585	495	540	1.88	287	3	269	160
2000	U	19	224	261	243	1.64	148	1	184	139
		20	---	245	245	1.74	140	1	174	136
	L	41	---	---	---	----	---	-	---	---
		42	267	256	261	1.74	150	3	143	76
3000	U	21	343	347	345	1.76	196	1	243	93
		22	185	212	199	1.69	117	1	145	72
	L	43	329	355	342	1.77	193	3	184	111
		44	354	380	367	1.77	207	3	198	111

TABLE AII.262 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	48	52	54	60	52	54
58	64	84	--	60	58	64
59	(60)	(59)	48	42	52	56
60	60	48	48	50	56	52
61	56	58	48	44	52	52
62	56	58	48	45	56	52
63	80	54	52	63	58	58
64	48	46	50	50	56	54
65	64	66	64	64	74	72
66	52	52	44	52	62	56
96	60	62	56	56	54	64
97	48	52	52	60	48	52
98	64	60	54	60	68	66

TABLE AII.263

LYING PULSE RATE: FLIGHT 4
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	64	64	58	58	68	62
68	56	70	50	44	54	--
69	56	60	48	44	56	64
70	42	60	52	48	56	58
71	60	72	44	50	62	58
72	60	66	46	52	56	56
73	56	64	56	68	--	--
74	68	64	62	68	68	62
75	48	58	44	52	64	60
76	60	58	64	56	54	68
77	52	50	--	--	--	--
78	52	68	48	48	62	60
79	56	62	56	52	54	56
80	56	58	52	48	64	64
81	62	66	40	42	58	56
82	(58)	56	60	--	--	64
83	68	64	64	56	62	66
84	62	68	58	56	60	78
85	60	76	62	64	62	72
86	60	60	56	56	56	74
87	68	76	--	--	--	60
88	62	64	--	--	--	--
99	58	54	44	48	46	44
100	52	58	44	44	50	64
101	68	70	68	64	60	68

TABLE AII.264

STANDING PULSE RATE: FLIGHT 1
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	84	64	84	88	72	62
2	80	72	--	--	--	78
3	70	64	72	92	76	58
4	72	80	92	80	68	84
5	60	64	68	--	--	60
6	85	64	60	78	80	100
7	80	68	52	80	76	66
8	75	64	76	88	76	60
9	76	76	92	66	84	76
10	72	68	72	78	68	88
11	72	80	84	64	68	68
12	80	84	92	76	92	86
13	70	84	80	--	--	--
14	86	84	64	96	76	78
15	60	64	72	92	--	--
16	96	76	72	--	--	--
17	76	(84)	80	86	68	64
18	134	116	68	100	96	104
19	88	78	76	84	80	80
20	98	86	80	--	--	--
21	116	88	104	108	104	86
22	118	78	68	102	88	82
90	106	88	92	100	80	82
91	84	76	88	84	92	88
92	76	84	80	92	76	86

TABLE AII.265

STANDING PULSE RATE: FLIGHT 2
(beats/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	56	72	108	96	64	74
24	60	96	92	82	--	--
25	68	100	112	104	86	104
26	72	96	92	94	84	76
27	88	104	92	96	88	96
28	88	104	92	82	86	82
29	68	68	72	68	66	64
30	(71)	96	76	108	78	68
31	52	64	104	64	66	72
32	68	68	80	98	78	84
33	52	84	64	72	72	64
34	88	96	108	104	82	94

TABLE AII.274

RESTING OXYGEN CONSUMPTION: PRE I, LIGHT WORK
(Factors: Unit 1 = 1.241; Unit 3 = 0.956)

Diet	Water	Subject	ml/O2/min Run 1	Run 2	$\bar{X}$	S.A.	ml/O2/M2/min	Unit No.	Corrected ml/M2/min	% of PRE II
ST 0	U	45	299	351	325	1.79	181	3	173	109
		46	455	355	405	1.93	209	3	200	134
		47	310	267	289	1.79	161	1	200	124
		48	423	390	407	1.98	206	3	197	117
		54	293	310	301	1.75	172	1	213	137
	L	67	223	262	243	1.70	142	1	176	84
		68	226	250	238	1.78	133	1	165	94
		69	322	352	337	1.82	185	3	177	114
		70	268	252	260	1.82	142	1	176	88
0/100/0 1000	U	49	262	260	261	1.78	146	1	181	94
		50	255	252	253	1.68	150	1	186	115
	L	71	341	291	316	1.73	182	3	174	102
		72	378	369	373	1.84	202	3	193	121
2000	U	51	599	427	513	2.02	253	1	314	189
		52	267	243	255	1.86	137	1	170	98
	L	73	359	350	355	1.68	211	3	202	109
		74	355	369	362	1.88	192	3	183	124
30/0/70	U	53	220	175	197	1.70	115	1	143	84
1000	L	75	441	534	487	1.77	275	3	263	133
		76	302	269	285	1.62	175	3	167	106
2000	U	55	202	207	205	1.60	128	1	159	79
		56	221	238	229	1.78	128	1	159	100
	L	77	233	279	256	1.78	143	3	137	94
		78	364	280	322	1.89	170	3	162	89
2/20/78	U	57	323	286	299	1.94	154	3	147	103
1000		58	262	203	233	1.82	128	1	159	93
	L	79	255	229	242	1.74	139	1	172	92
		80	328	274	301	1.70	177	3	169	109
2000	U	59	---	---	---	----	---	-	---	---
		60	266	226	246	2.00	123	1	153	114
	L	81	250	---	250	1.83	136	1	169	94
		82	306	---	306	1.75	174	3	166	95
15/52/33	U	61	327	303	315	1.88	167	3	160	116
1000		62	272	221	247	1.88	131	1	163	97
	L	83	351	262	307	1.75	175	1	217	112
		84	297	330	313	1.79	174	3	166	99
2000	U	63	336	334	335	1.93	173	3	165	104
		64	303	290	297	1.98	150	1	186	113
	L	85	324	302	313	1.85	169	3	162	89
		86	236	247	241	1.71	140	1	174	99
3000	U	65	358	342	350	1.95	179	3	171	86
		66	548	426	487	1.98	245	3	234	121
	L	87	302	208	285	2.09	136	1	109	117
		88	581	522	551	1.82	302	1	375	211

TABLE AII.275

RESTING OXYGEN CONSUMPTION, PRE II, FRA SUBJECTS:
CALCULATION OF CORRECTION FACTORS

Subject Number	Mean Observed ($ml/O_2/M^2/min$)	Unit Number	Corrected ($ml/O_2/M^2/min$)
90	194	1	167
91	246	1	212
92	186	3	183
94	157	3	154
95	354*	1	---*
96	175	1	151
97	166	3	163
98	274	1	236
99	166	3	163
100	124	1	107
101	214	3	210

* Subject 95 omitted from calculation because of aberrant results.

	Unit 1	Unit 3
Mean	203	178
Range	124-274	157-214
Factor	$\frac{175}{203} = 0.862$	$\frac{175}{178} = 0.983$

TABLE AII.276

RESTING OXYGEN CONSUMPTION: PRE II, HARD WORK
(Factors: Unit 1 = 0.862; Unit 3 = 0.983)

Diet	Water	Subject	ml/O2/min Run 1	Run 2	$\bar{X}$	S.A.	ml/O2/M2/min	Unit No.	Corrected ml/O2/M2/min
ST 0	U	1	355	283	319	1.72	185	3	182
		2	296	272	284	1.84	154	3	151
		3	443	326	384	1.70	225	1	194
		4	444	447	445	1.96	227	3	223
	L	23	273	349	311	1.93	161	1	139
		24	---	---	---	----	---	-	---
		25	345	252	298	1.80	165	3	162
		26	374	320	347	1.57	221	1	191
0/100/0 1000	U	5	262	319	290	1.68	172	1	148
		6	343	363	353	1.81	195	1	168
	L	27	---	457	457	1.55	294	3	289
		28	324	326	325	1.72	188	3	185
2000	U	7	380	232	306	1.89	161	3	158
		8	305	349	327	1.70	192	1	165
	L	29	318	392	355	1.92	184	1	159
		30	274	287	280	1.70	164	3	161
30/0/70 1000	U	9	329	321	325	1.99	163	3	160
		10	331	332	331	1.68	197	3	194
	L	31	441	440	441	2.20	200	1	172
		32	328	360	344	1.76	195	1	168
2000	U	11	216	353	284	1.78	159	3	156
		12	311	351	331	1.90	174	3	171
	L	33	329	306	317	1.76	180	1	155
		34	326	285	305	1.67	182	1	157
2/20/78 1000	U	13	261	249	255	1.83	139	3	137
		14	307	294	300	1.73	173	3	170
	L	35	275	264	269	1.71	157	1	135
		36	329	426	377	1.74	216	1	186
2000	U	15	261	250	255	1.85	137	3	135
		16	282	263	272	1.70	160	3	157
	L	37	228	296	262	1.76	148	1	128
		38	420	326	373	1.84	202	1	174
15/52/33 1000	U	17	299	452	360	2.06	175	3	172
		18	172	365	268	1.73	154	3	151
	L	39	298	230	264	1.52	173	3	170
		40	435	307	371	1.86	199	1	171
2000	U	19	241	201	221	1.64	134	3	132
		20	301	220	260	1.75	148	1	128
	L	41	324	296	310	1.73	179	1	154
		42	311	355	333	1.75	190	3	187
3000	U	21	551	385	468	1.75	267	3	262
		22	336	353	345	1.68	205	3	201
	L	43	313	366	339	1.75	193	1	166
		44	391	321	356	1.72	206	1	178

TABLE AII.277

RESTING OXYGEN CONSUMPTION: PRE II, LIGHT WORK
(Factors: Unit 1 = 0.862; Unit 3 = 0.983)

Diet	Water	Sub-ject	ml/O_2/min Run 1	Run 2	$\bar{\bar{X}}$	S.A.	ml/O_2/M^2/min	Unit No.	Corrected ml/O_2/M^2/min
ST 0	U	45	303	299	301	1.86	161	3	158
		46	350	308	329	1.90	173	1	149
		47	312	280	296	1.80	164	3	161
		48	379	404	391	2.00	195	1	168
		54	293	265	279	1.75	159	3	156
	L	67	502	326	414	1.70	243	1	209
		68	287	247	317	1.78	178	3	175
		69	344	310	327	1.82	180	1	155
		70	361	378	369	1.82	203	3	199
0/100/0	U	49	336	355	345	1.77	195	3	192
1000		50	288	349	318	1.70	187	1	161
	L	71	369	322	345	1.74	198	1	171
		72	319	279	299	1.84	163	3	160
2000	U	51	---	---	---	----	---	-	---
		52	417	245	331	1.88	176	3	173
	L	73	329	299	314	1.66	189	3	186
		74	320	335	327	1.90	172	1	148
30/0/70	U	53	324	345	334	1.69	198	1	171
1000	L	75	393	319	356	1.77	201	3	198
		76	300	283	291	1.60	182	1	157
2000	U	55	353	307	330	1.61	205	3	201
		56	354	311	332	1.79	185	1	159
	L	77	335	255	295	1.76	168	1	145
		78	431	267	349	1.88	186	3	183
2/20/78	U	57	334	287	310	1.87	166	1	143
1000		58	349	368	358	1.82	197	1	170
	L	79	348	310	329	1.74	189	3	186
		80	271	267	269	1.70	158	3	155
2000	U	59	---	---	---	----	---	-	---
		60	310	---	310	1.99	156	1	134
	L	81	352	314	333	1.83	182	3	179
		82	---	---	---	----	---	-	---
15/52/33	U	61	334	272	303	1.89	160	1	138
1000		62	351	293	322	1.88	171	3	168
	L	83	349	343	346	1.76	197	3	194
		84	332	366	349	1.80	194	1	167
2000	U	63	388	324	356	1.92	185	1	159
		64	346	309	327	1.95	168	3	165
	L	85	374	315	345	1.86	185	3	182
		86	363	337	350	1.72	203	1	175
3000	U	65	384	408	396	1.95	203	3	199
		66	348	543	445	1.98	225	1	194
	L	87	339	368	353	2.10	168	1	145
		88	317	340	329	1.82	181	3	178

TABLE AII.278

RESTING OXYGEN CONSUMPTION, EXP I, FRA SUBJECTS:
CALCULATION OF CORRECTION FACTORS

Subject Number	Mean Observed ($ml/O_2/M^2/min$)	Unit Number	Corrected ($ml/O_2/M^2/min$)
90	130	3	168
91	207	1	175
92	145	3	186
94	136	3	175
95	206	1	174
96	128	3	165
97	208	1	176
98	193	1	163
99	207	1	175
100	141	3	181
101	222	1	188

	Unit 1	Unit 3
Mean	207	136
Range	193-222	128-145
Factor	$\frac{175}{207} = 0.845$	$\frac{175}{136} = 1.286$

TABLE AII.279

RESTING OXYGEN CONSUMPTION: EXP I, HARD WORK
(Factors: Unit 1 = 0.845; Unit 3 = 1.286)

Diet	Water	Subject	$ml/O_2/min$ Run 1	Run 2	$\bar{X}$	S.A.	$ml/O_2/M^2/min$	Unit No.	Corrected $ml/O_2/M^2/min$	% of PRE II
ST O	U	1	229	242	235	1.70	138	3	178	98
		2	258	222	240	1.82	132	3	170	113
		3	248	254	251	1.68	149	3	192	99
		4	599	604	599	1.94	309	1	261	117
	L	23	314	297	305	1.88	162	1	137	99
		24	269	267	268	1.56	172	1	145	85
		25	291	240	265	1.74	152	1	128	79
		26	194	208	201	1.55	130	3	168	88
0/100/0	U	5	272	212	242	1.66	146	3	188	127
1000		6	204	265	235	1.78	132	3	170	101
	L	27	295	243	269	1.52	177	1	150	52
		28	262	284	273	1.69	162	1	137	74
2000	U	7	---	275	275	1.86	148	1	125	79
		8	244	213	229	1.69	136	3	175	106
	L	29	233	233	233	1.90	123	3	159	100
		30	245	266	255	1.78	143	1	121	75
30/0/70	U	9	354	316	335	1.96	171	3	221	138
1000		10	336	258	297	1.72	173	3	223	115
	L	31	360	409	385	1.98	194	1	164	95
		32	427	423	425	1.73	246	1	208	124
2000	U	11	231	340	285	1.78	160	3	206	132
		12	370	361	365	1.88	194	3	250	146
	L	33	355	316	335	1.72	195	1	165	106
		34	309	318	313	1.64	191	1	162	103
2/20/78	U	13	274	---	274	1.82	151	1	128	93
1000		14	214	197	205	1.76	116	3	150	88
	L	35	203	208	205	1.69	121	3	156	115
		36	345	303	324	1.72	188	1	159	85
2000	U	15	242	---	242	1.85	131	3	169	125
		16	538	416	477	1.70	281	3	362	231
	L	37	283	303	293	1.74	168	1	142	111
		38	322	289	305	1.80	169	1	143	82
15/52/33	U	17	247	254	251	2.04	123	3	159	92
1000		18	---	296	296	1.70	174	3	224	148
	L	39	289	321	305	1.64	186	1	157	92
		40	---	---	---	----	---	-	---	---
2000	U	19	242	203	223	1.62	138	3	178	135
		20	205	170	187	1.76	101	3	130	101
	L	41	---	---	---	----	---	-	---	---
		42	370	348	359	1.72	209	1	177	95
3000	U	21	288	314	301	1.74	173	3	223	85
		22	---	283	283	1.68	168	1	142	71
	L	43	267	342	305	1.73	176	1	149	90
		44	248	299	273	1.75	156	3	201	113

TABLE AII.280

RESTING OXYGEN CONSUMPTION: EXP I, LIGHT WORK
(Factors: Unit 1 = 0.845; Unit 3 = 1.286)

Diet	Water	Subject	ml/O_2/min Run 1	ml/O_2/min Run 2	$\bar{X}$	S.A.	ml/O_2/M^2/min	Unit No.	Corrected ml/O_2/M^2/min	% of PRE II
ST O	U	45	332	328	330	1.76	187	1	158	100
		46	375	385	380	1.85	205	1	173	116
		47	428	339	383	1.75	219	1	185	115
		48	270	263	267	1.94	138	3	178	106
		54	651	572	611	1.71	357	1	302	193
	L	67	308	358	333	1.66	201	3	259	124
		68	253	180	217	1.74	125	3	161	92
		69	278	227	253	1.79	141	3	182	117
		70	247	---	247	1.78	139	3	179	90
0/100/0	U	49	346	330	338	1.74	194	1	164	85
1000		50	244	312	278	1.66	167	1	141	87
	L	71	---	209	209	1.70	123	3	159	93
		72	230	214	222	1.80	123	3	159	99
2000	U	51	227	190	209	1.98	106	3	137	83
		52	250	280	265	1.85	143	1	121	70
		74	226	236	231	1.86	124	3	160	95
	L	73	364	318	341	1.63	209	1	177	108
30/0/70	U	53	576	522	549	1.66	331	1	280	164
1000	L	75	244	232	238	1.70	140	3	181	91
		76	255	228	241	1.57	153	3	197	125
2000	U	55	205	191	198	1.59	125	3	161	80
		56	414	375	395	1.76	224	1	189	119
	L	77	---	---	---	----	---	-	---	---
		78	419	325	372	1.84	202	3	261	143
2/20/78	U	57	234	---	234	1.85	126	3	163	114
1000		58	---	---	---	----	---	-	---	---
	L	79	---	---	---	1.70	---	1	---	---
		80	---	---	---	1.68	---	1	---	---
2000	U	59	244	254	249	1.81	138	3	178	107
		60	321	340	331	1.96	169	3	218	163
	L	81	398	301	349	1.80	194	1	164	92
		82	322	---	322	1.71	188	1	159	91
15/52/33	U	61	209	265	237	1.86	127	3	164	119
1000		62	271	323	297	1.85	161	1	136	81
	L	83	372	361	367	1.72	213	1	180	93
		84	273	238	255	1.76	145	3	187	112
2000	U	63	310	291	301	1.91	158	3	204	128
		64	257	272	265	1.94	137	3	177	107
	L	85	454	410	432	1.82	237	1	200	110
		86	483	477	480	1.69	284	1	240	137
3000	U	65	301	261	281	1.94	145	3	187	94
		66	---	---	---	1.96	---	1	---	---
	L	87	---	---	---	----	---	-	---	---
		88	---	---	---	----	---	-	---	---

TABLE AII.281

RESTING OXYGEN CONSUMPTION: EXP II, HARD WORK
(Factors: Unit 1 = 0.845; Unit 3 = 1.290)

Diet	Water	Subject	ml/O_2/min Run 1	Run 2	$\bar{X}$	S.A.	ml/O_2/M^2/min	Unit No.	Corrected ml/O_2/M^2/min	% of PRE II
ST 0	U	1	234	246	240	1.66	145	3	187	103
		3	268	266	267	1.64	163	3	210	108
	L	23	464	336	400	1.85	216	1	183	132
		24	213	235	224	1.50	149	3	192	112
		25	375	341	358	1.72	208	1	176	109
0/100/0	U	5	394	318	356	1.64	217	1	183	124
1000	L	27	243	235	239	1.52	157	3	203	70
2000	U	7	418	428	423	1.86	227	1	192	121
	L	29	269	253	261	1.89	138	3	178	112
30/0/70	U	9	---	---	---	1.92	---	-	---	---
1000	L	31	361	377	369	2.00	185	3	239	139
2000	U	11	417	445	431	1.75	246	1	208	133
	L	33	347	277	312	1.71	182	3	235	152
2/20/78 1000	L	35	399	330	365	1.67	219	1	185	137
2000	U	15	399	344	371	1.85	201	1	170	126
	L	37	278	252	265	1.74	152	3	196	153
15/52/33 1000	U	17	263	238	251	2.03	124	3	160	94
2000	U	19	377	343	360	1.62	222	1	188	142
FRA		90	591	572	581	1.95	298	1	252	
		91	333	315	324	2.02	160	3	206	
		94	491	434	463	2.00	231	1	195	

TABLE AII.282

RESTING OXYGEN CONSUMPTION: RECOVERY, FRA SUBJECTS
CALCULATION OF CORRECTION FACTORS

Subject Number	Mean Observed ($ml/O_2/M^2/min$)	Unit Number	Corrected ($ml/O_2/M^2/min$)
90	182	1	163
91	318*	1	---*
92	186	3	207
94	143	3	159
95	202	1	180
96	150	3	167
97	230	1	205
98	207	3	231
99	156	1	139
100	100	3	111
101	208	1	186

* Subject 91 omitted from calculation because of aberrant results.

	Unit 1	Unit 3
Mean	196	157
Range	156-230	100-207
Factor	$\frac{175}{196} = 0.893$	$\frac{175}{157} = 1.115$

TABLE AII.283

RESTING OXYGEN CONSUMPTION: RECOVERY, HARD WORK
(Factors: Unit 1 = 0.893; Unit 3 = 1.115)

Diet	Water	Subject	ml/O2/min Run 1	ml/O2/min Run 2	$\bar{X}$	S.A.	$ml/O_2/M^2/min$	Unit No.	Corrected $ml/O_2/M^2/min$	% of PRE II
ST O	U	1	286	288	287	1.70	169	1	151	83
		2	381	334	357	1.84	194	1	FRA	---
		3	411	419	415	1.67	249	1	222	114
		4	403	406	405	1.94	209	1	187	84
	L	23	315	340	327	1.88	174	3	194	139
		24	---	---	---	----	---	-	---	---
		25	258	212	235	1.76	133	3	148	91
		26	361	297	329	1.55	212	3	236	124
0/100/0 1000	U	5	434	383	409	1.68	243	1	FRA	---
		6	398	332	365	1.78	205	1	183	109
	L	27	383	293	388	1.54	252	3	281	97
		28	---	225	225	1.70	132	3	147	79
2000	U	7	390	403	397	1.88	211	1	188	119
		8	419	366	392	1.68	233	1	208	126
	L	29	366	378	372	1.90	196	3	219	138
		30	268	261	265	1.79	148	3	165	102
30/0/70 1000	U	9	409	423	416	1.95	213	1	190	119
		10	409	380	394	1.73	228	1	204	105
	L	31	516	563	539	1.90	284	3	FRA	---
		32	196	262	229	1.73	132	3	147	87
2000	U	11	344	449	396	1.78	222	1	198	127
		12	465	430	447	1.89	237	1	212	124
	L	33	446	386	416	1.74	239	3	266	172
		34	---	242	242	1.66	146	3	163	104
2/20/78 1000	U	13	---	---	---	----	---	-	---	---
		14	361	392	376	1.78	211	1	188	111
	L	35	318	325	321	1.70	189	1	169	125
		36	197	296	246	1.73	142	3	158	85
2000	U	15	---	---	---	----	---	-	---	---
		16	---	---	---	----	---	-	---	---
	L	37	361	319	340	1.76	193	3	215	168
		38	340	315	327	1.82	180	1	161	93
15/52/33 1000	U	17	240	293	266	2.02	132	3	147	85
		18	---	---	---	----	---	-	---	---
	L	39	---	---	---	----	---	-	---	---
		40	321	260	290	1.90	153	3	FRA	---
2000	U	19	373	419	396	1.64	241	1	215	163
		20	---	---	---	----	---	-	---	---
	L	41	303	247	275	1.71	161	3	FRA	---
		42	230	469	349	1.79	195	1	174	93
3000	U	21	537	420	478	1.78	269	1	240	92
		22	347	295	321	1.68	191	1	171	85
	L	43	391	375	383	1.76	218	3	243	146
		44	318	312	315	1.77	178	3	198	111

TABLE AII.284

RESTING OXYGEN CONSUMPTION: RECOVERY, LIGHT WORK
(Factors: Unit 1 = 0.893; Unit 3 = 1.115)

Diet	Water	Subject	ml/O_2/min Run 1	Run 2	$\bar{X}$	S.A.	ml/O_2/M^2/min	Unit No.	Corrected ml/O_2/M^2/min	% of PRE II
ST 0	U	45	255	258	257	1.76	146	1	130	82
		46	345	421	383	1.88	204	1	182	122
		47	346	328	337	1.75	193	1	172	107
		48	420	371	395	1.94	204	1	182	108
		54	409	305	357	1.72	207	1	185	119
	L	67	238	270	254	1.70	149	3	166	79
		68	---	---	---	----	---	-	---	---
		69	217	244	230	1.80	128	3	143	92
		70	379	356	367	1.80	204	3	227	114
0/100/0	U	49	327	368	347	1.76	197	1	176	92
1000		50	474	399	437	1.67	262	1	234	145
	L	71	266	242	254	1.72	148	3	165	96
		72	242	213	227	1.81	125	3	139	87
2000	U	51	391	345	368	2.00	184	1	164	99
		52	375	---	375	1.87	201	1	179	103
	L	73	---	---	---	----	---	-	---	---
		74	225	287	256	1.92	133	3	148	100
30/0/70	U	53	261	292	276	1.67	165	1	147	86
1000	L	75	317	332	325	1.74	187	3	209	105
		76	218	278	248	1.59	156	3	174	111
2000	U	55	347	356	351	1.62	217	3	242	120
		56	444	391	417	1.80	232	1	207	130
	L	77	---	---	---	----	---	-	---	---
		78	476	274	375	1.90	197	3	220	120
2/20/78	U	57	262	248	255	1.85	139	3	155	108
1000		58	296	299	297	1.79	166	1	FRA	---
	L	79	316	313	315	1.70	185	1	165	89
		80	328	158	243	1.69	144	3	160	103
2000	U	59	380	350	365	1.82	201	1	179	108
		60	463	300	381	1.96	194	1	173	129
	L	81	206	203	205	1.82	113	3	126	70
		82	432	388	410	1.74	236	1	211	121
15/52/33	U	61	305	320	313	1.87	167	1	149	108
1000		62	---	---	---	----	---	-	---	---
	L	83	194	184	189	1.74	109	3	121	62
		84	222	385	303	1.76	172	3	192	115
2000	U	63	455	418	436	1.92	227	1	203	128
		64	450	358	404	1.94	208	1	186	113
	L	85	221	151	186	1.84	101	3	113	62
		86	298	332	315	1.70	185	3	206	118
3000	U	65	307	355	331	1.95	170	3	189	95
		66	---	---	---	----	---	-	---	---
	L	87	390	414	402	2.10	191	1	FRA	---
		88	---	---	---	----	---	-	---	---

TABLE AII.285

RESTING CARBON DIOXIDE PRODUCTION, PRE I: FRA SUBJECTS
CALCULATION OF CORRECTION FACTORS

Subject Number	Mean Observed ($ml/CO_2/M^2/min$)	Unit Number	Corrected ($ml/CO_2/M^2/min$)
90	97	1	125
91	122	1	157
92	118	1	152
93	155	3	137
94	205	3	181
95	156	3	138
96	190	3	168
97	103	1	133
98	138	1	178
99	116	1	149
100	134	3	118
101	171	3	151

	Unit 1	Unit 3
Mean	115.6	168.5
Range	97-138	134-205
Factor	$\frac{149}{115.6} = 1.288$	$\frac{149}{168.5} = 0.884$

TABLE AII.286

RESTING CARBON DIOXIDE PRODUCTION: PRE I, HARD WORK
(Factors: Unit 1 = 1.288; Unit 3 = 0.884)

Diet	Water	Subject	$ml/CO_2/min$ Run 1	Run 2	$\bar{X}$	S.A.	$ml/CO_2/M^2/min$	Unit No.	Corrected $ml/CO_2/M^2/min$	% of PRE II
ST 0	U	1	212	156	184	1.72	107	1	138	109
		2	207	181	194	1.84	105	1	135	126
		3	219	222	221	1.68	131	1	169	86
		4	185	220	203	1.96	103	1	133	84
	L	23	272	327	299	1.94	154	3	136	73
		24	298	250	274	1.58	173	3	153	129
		25	362	386	374	1.80	208	3	184	125
		26	245	258	251	1.58	159	3	141	72
0/100/0 1000	U	5	324	287	305	1.70	179	1	231	146
		6	274	260	267	1.79	149	1	192	119
	L	27	268	258	263	1.55	170	3	150	80
		28	489	500	495	1.70	291	3	257	197
2000	U	7	319	248	283	1.89	98	1	126	74
		8	108	133	121	1.70	71	1	91	51
	L	29	283	415	349	1.92	182	3	161	86
		30	276	282	279	1.80	155	3	137	106
30/0/70 1000	U	9	200	228	214	1.98	108	3	113	93
		10	208	189	199	1.72	116	1	149	115
	L	31	---	390	390	2.04	191	3	169	142
		32	455	347	401	1.74	230	3	203	112
2000	U	11	240	225	233	1.78	131	1	169	142
		12	228	195	211	1.90	111	1	143	106
	L	33	136	395	265	1.78	149	3	132	76
		34	308	308	308	1.68	183	3	162	117
2/20/78 1000	U	13	---	204	204	1.84	111	1	143	89
		14	214	---	214	1.77	121	1	156	125
	L	35	190	---	190	1.72	110	3	97	79
		36	316	339	327	1.75	187	3	165	146
2000	U	15	216	163	189	1.85	102	1	131	126
		16	---	---	---	---	---	-	---	---
	L	37	249	170	209	1.77	118	3	104	70
		38	448	397	423	1.78	238	3	210	130
15/52/33 1000	U	17	190	---	190	1.99	95	1	122	90
		18	---	---	---	1.72	---	1	---	---
	L	39	213	178	195	1.66	117	3	103	95
		40	334	258	296	1.88	157	3	139	98
2000	U	19	193	188	191	1.64	116	1	149	109
		20	---	241	241	1.74	139	1	179	138
	L	41	---	---	---	---	---	-	---	---
		42	292	294	293	1.74	168	3	149	108
3000	U	21	144	166	155	1.76	88	1	113	86
		22	278	175	227	1.69	134	1	173	91
	L	43	214	197	205	1.77	116	3	103	67
		44	272	254	263	1.77	149	3	132	76

TABLE AII.287

RESTING CARBON DIOXIDE PRODUCTION: PRE I, LIGHT WORK
(Factors: Unit 1 = 1.288; Unit 3 = 0.884)

Diet	Water	Subject	$ml/CO_2/min$ Run 1	Run 2	$\bar{X}$	S.A.	$ml/CO_2/M^2/min$	Unit No.	Corrected $ml/CO_2/M^2/min$	% of PRE II
ST 0	U	45	315	342	329	1.79	184	3	163	111
		46	456	344	400	1.93	207	3	183	143
		47	226	236	231	1.79	129	1	166	111
		48	393	334	363	1.98	183	3	162	96
		54	194	174	184	1.75	105	1	135	96
	L	67	205	227	216	1.70	127	1	164	107
		68	176	194	185	1.78	104	1	134	92
		69	338	320	329	1.82	181	3	160	87
		70	276	229	253	1.82	139	1	179	91
0/100/0 1000	U	49	250	223	237	1.78	133	1	171	105
		50	211	215	213	1.68	127	1	164	102
	L	71	277	235	256	1.73	148	3	131	92
		72	349	337	343	1.84	186	3	164	123
2000	U	51	247	215	231	2.02	114	1	147	99
		52	225	234	229	1.86	123	1	158	116
	L	73	344	323	333	1.68	198	3	175	107
		74	347	355	351	1.88	187	3	165	115
30/0/70	U	53	168	167	167	1.70	98	1	126	102
1000	L	75	315	272	293	1.77	165	3	146	97
		76	320	249	285	1.62	176	3	156	92
2000	U	55	242	107	175	1.60	109	1	140	79
		56	244	190	217	1.78	122	1	157	116
	L	77	313	199	256	1.78	144	3	127	102
		78	314	287	301	1.89	159	3	141	117
2/20/78 1000	U	57	294	238	266	1.94	137	3	121	96
		58	267	193	230	1.82	126	1	162	101
	L	79	197	143	170	1.74	98	1	126	84
		80	173	199	186	1.70	109	3	96	92
2000	U	59	---	---	---	---	---	-	---	---
		60	189	195	192	2.00	96	1	124	107
	L	81	180	---	180	1.83	98	1	126	79
		82	287	243	265	1.75	151	3	133	90
15/52/33 1000	U	61	331	291	311	1.88	165	3	146	126
		62	157	217	187	1.88	99	1	127	93
	L	83	219	157	188	1.75	107	1	138	99
		84	287	222	255	1.79	142	3	125	127
2000	U	63	285	259	272	1.93	141	3	125	99
		64	188	190	189	1.98	95	1	122	98
	L	85	312	265	289	1.85	156	3	138	95
		86	184	291	237	1.71	139	1	179	100
3000	U	65	310	338	324	1.95	166	3	147	81
		66	347	399	373	1.98	188	3	166	119
	L	87	234	243	239	2.09	114	1	147	107
		88	179	204	191	1.82	105	1	135	94

TABLE AII.288

RESTING CARBON DIOXIDE PRODUCTION, PRE II, FRA SUBJECTS: CALCULATION OF CORRECTION FACTORS

Subject Number	Mean Observed ($ml/CO_2/M^2/min$)	Unit Number	Corrected ($ml/CO_2/M^2/min$)
90	142	1	136
91	178	1	170
92	132	3	126
94	143	3	137
95	157	1	150
96	135	1	129
97	143	3	137
98	167	1	160
99	166	3	159
100	98*	1	---*
101	195	3	186

* Subject 100 omitted from calculation because of aberrant results.

	Unit 1	Unit 3
Mean	156	156
Range	135-178	132-195
Factor	$\frac{149}{156} = 0.956$	$\frac{149}{156} = 0.956$

TABLE AII.289

RESTING CARBON DIOXIDE PRODUCTION: PRE II, HARD WORK
(Factors: Unit 1 = 0.956; Unit 3 = 0.956)

Diet	Water	Subject	$ml/CO_2/min$ Run 1	$ml/CO_2/min$ Run 2	$\bar{X}$	S.A.	$ml/CO_2/M^2/min$	Unit No.	Corrected $ml/CO_2/M^2/min$
ST 0	U	1	211	244	227	1.72	132	3	126
		2	206	206	206	1.84	112	3	107
		3	365	331	348	1.70	205	1	196
		4	309	338	323	1.96	165	3	158
	L	23	400	348	374	1.93	194	1	185
		24	172	220	196	1.57	125	1	119
		25	301	254	277	1.80	154	3	147
		26	329	315	322	1.57	205	1	196
0/100/0 1000	U	5	245	310	277	1.68	165	1	158
		6	301	311	306	1.81	169	1	162
	L	27	295	313	304	1.55	196	3	187
		28	236	232	234	1.72	136	3	130
2000	U	7	329	344	337	1.89	178	3	170
		8	362	276	319	1.70	188	1	180
	L	29	342	407	375	1.92	195	1	186
		30	249	211	230	1.70	135	3	129
30/0/70 1000	U	9	222	287	255	1.99	128	3	122
		10	223	235	229	1.68	136	3	130
	L	31	295	257	276	2.20	125	1	119
		32	356	310	333	1.76	189	1	181
2000	U	11	265	182	223	1.78	125	3	119
		12	257	281	269	1.90	141	3	135
	L	33	342	297	319	1.76	181	1	173
		34	278	204	241	1.67	144	1	138
2/20/78 1000	U	13	311	299	306	1.83	167	3	160
		14	245	208	227	1.73	131	3	125
	L	35	237	205	221	1.71	129	1	123
		36	198	212	205	1.74	118	1	113
2000	U	15	197	207	202	1.85	109	3	104
		16	110	199	155	1.70	91	3	87
	L	37	236	315	275	1.76	156	1	149
		38	332	287	309	1.84	168	1	161
15/52/33 1000	U	17	387	239	293	2.06	142	3	136
		18	227	199	213	1.73	123	3	118
	L	39	172	172	172	1.52	113	3	108
		40	267	286	277	1.86	149	1	142
2000	U	19	258	209	233	1.64	142	3	136
		20	245	231	238	1.75	136	1	139
	L	41	331	313	322	1.73	186	1	178
		42	213	294	253	1.75	144	3	138
3000	U	21	248	230	239	1.75	137	3	131
		22	308	360	334	1.68	199	3	190
	L	43	275	289	282	1.75	161	1	154
		44	342	281	311	1.72	181	1	173

TABLE AII.290

RESTING CARBON DIOXIDE PRODUCTION: PRE II, LIGHT WORK
(Factors: Unit 1 = 0.956; Unit 3 = 0.956)

Diet	Water	Subject	ml/CO2/min Run 1	Run 2	$\bar{X}$	S.A.	ml/CO_2/M^2/min	Unit No.	Corrected ml/CO2/M^2/min
ST 0	U	45	287	268	277	1.80	154	3	147
		46	247	261	254	1.90	134	1	128
		47	282	282	282	1.80	157	3	150
		48	362	349	355	2.00	177	1	169
		54	251	260	255	1.75	246	3	140
	L	67	290	254	272	1.70	160	1	153
		68	259	285	272	1.78	153	3	146
		69	331	365	348	1.82	191	1	183
		70	388	363	375	1.82	206	3	197
0/100/0 1000	U	49	318	289	303	1.77	171	3	163
		50	306	266	286	1.70	168	1	161
	L	71	270	248	259	1.74	149	1	142
		72	262	247	255	1.84	139	3	133
2000	U	51	323	300	311	2.00	155	1	148
		52	274	259	267	1.88	142	3	136
	L	73	270	297	283	1.66	170	3	163
		74	240	336	288	1.90	151	1	144
30/0/70	U	53	203	233	218	1.69	129	1	123
1000	L	75	274	284	279	1.77	158	3	151
		76	276	292	284	1.60	177	1	169
2000	U	55	311	285	298	1.61	185	3	177
		56	293	211	252	1.79	141	1	135
	L	77	254	208	231	1.76	131	1	125
		78	277	202	239	1.88	127	3	121
2/20/78 1000	U	57	237	256	247	1.87	132	1	126
		58	330	278	304	1.82	167	1	160
	L	79	266	282	274	1.74	157	3	150
		80	184	187	185	1.70	109	3	104
2000	U	59	---	---	---	----	---	-	143*
		60	239	---	239	1.99	120	1	115
	L	81	313	298	305	1.83	167	3	159
		82	---	---	---	----	---	-	147*
15/52/33 1000	U	61	244	214	229	1.89	121	1	116
		62	262	274	268	1.88	143	3	137
	L	83	271	241	256	1.76	145	3	139
		84	266	305	285	1.80	102	1	98
2000	U	63	268	240	254	1.92	132	1	126
		64	261	251	256	1.95	131	3	125
	L	85	318	250	284	1.86	153	3	146
		86	337	307	322	1.72	187	1	179
3000	U	65	363	376	369	1.95	189	3	181
		66	303	277	290	1.98	146	1	140
	L	87	285	316	301	2.10	143	1	137
		88	287	258	273	1.82	150	3	143

* Flight mean

TABLE AII.291

RESTING CARBON DIOXIDE PRODUCTION, EXP I, FRA SUBJECTS: CALCULATION OF CORRECTION FACTORS

Subject Number	Mean Observed ($ml/CO_2/M^2/min$)	Unit Number	Corrected ($ml/CO_2/M^2/min$)
90	105	3	149
91	185	1	178
92	127	3	180
94	93	3	132
95	143	1	137
96	87	3	123
97	150	1	144
98	155	1	149
99	126	1	121
100	114	3	162
101	171	1	164

	Unit 1	Unit 3
Mean	155	105
Range	126-185	87-127
Factor	$\frac{149-}{155}$ = 0.961	$\frac{149}{105}$ = 1.419

TABLE AII.292

RESTING CARBON DIOXIDE PRODUCTION: EXP I, HARD WORK
(Factors: Unit 1 = 0.961; Unit 3 = 1.419)

Diet	Water	Subject	$ml/CO_2/min$ Run 1	Run 2	$\bar{X}$	S.A.	$ml/CO_2/M^2/min$	Unit No.	Corrected $ml/CO_2/M^2/min$	% of PRE II
ST 0	U	1	119	160	140	1.70	82	3	116	92
		2	133	115	124	1.82	68	3	96	90
		3	142	138	140	1.68	83	3	118	60
		4	547	530	538	1.94	277	1	266	168
	L	23	220	254	237	1.88	126	1	121	65
		24	223	181	202	1.56	129	1	124	104
		25	248	110	179	1.74	102	1	98	67
		26	96	134	115	1.55	74	3	105	53
0/100/0 1000	U	5	187	151	169	1.66	101	3	143	91
		6	144	96	120	1.78	67	3	95	59
	L	27	240	229	234	1.52	153	1	147	79
		28	221	236	228	1.69	134	1	129	99
2000	U	7	---	292	292	1.86	156	1	150	88
		8	199	197	198	1.69	117	3	166	92
	L	29	178	206	192	1.90	101	3	143	77
		30	270	275	273	1.78	153	1	147	114
30/0/70 1000	U	9	182	207	195	1.96	99	3	140	115
		10	156	164	160	1.72	93	3	132	101
	L	31	195	398	296	1.98	149	1	143	120
		32	326	327	327	1.73	189	1	182	101
2000	U	11	141	245	193	1.78	108	3	153	129
		12	237	205	221	1.88	117	3	166	123
	L	33	318	272	295	1.72	171	1	164	95
		34	263	293	278	1.64	169	1	162	117
2/20/78 1000	U	13	213	215	214	1.82	117	1	112	70
		14	194	175	184	1.76	104	3	148	118
	L	35	100	114	107	1.69	63	3	89	72
		36	297	371	334	1.72	194	1	186	165
2000	U	15	159	117	138	1.85	74	3	105	101
		16	124	165	144	1.70	84	3	119	137
	L	37	294	202	248	1.74	142	1	136	91
		38	304	233	268	1.80	148	1	142	88
15/52/33 1000	U	17	174	115	144	2.04	70	3	99	73
		18	145	176	160	1.70	94	3	133	113
	L	39	232	274	253	1.64	154	1	148	137
		40	---	---	---	---	---	-	---	---
2000	U	19	168	141	154	1.62	95	3	135	99
		20	123	127	125	1.76	71	3	101	78
	L	41	---	---	---	---	---	-	---	---
		42	435	416	425	1.72	247	1	237	172
3000	U	21	184	235	209	1.74	120	3	170	130
		22	---	322	322	1.68	191	1	184	97
	L	43	242	253	247	1.73	142	1	136	88
		44	204	215	209	1.75	119	3	169	98

TABLE AII.293

RESTING CARBON DIOXIDE PRODUCTION: EXP I, LIGHT WORK
(Factors: Unit 1 = 0.961; Unit 3 = 1.419)

Diet	Water	Subject	$ml/CO_2/min$ Run 1	Run 2	$\bar{\bar{X}}$	S.A.	$ml/CO_2/M^2/min$	Unit No.	Corrected $ml/CO_2/M^2/min$	% of PRE II
ST O	U	45	236	180	208	1.76	118	1	113	77
		46	235	236	235	1.85	127	1	122	95
		47	202	234	218	1.75	124	1	119	79
		48	169	123	146	1.94	75	3	106	63
		54	172	188	180	1.71	105	1	101	72
	L	67	176	189	182	1.66	109	3	155	101
		68	241	106	173	1.74	99	3	141	97
		69	195	173	184	1.79	102	3	145	79
		70	161	---	161	1.78	90	3	128	65
0/100/0	U	49	264	199	231	1.74	132	1	127	78
1000		50	274	274	274	1.66	165	1	159	99
	L	71	152	162	157	1.70	92	3	131	92
		72	178	136	157	1.80	87	3	123	92
2000	U	51	239	200	219	1.98	110	3	156	105
		52	254	247	251	1.85	135	1	130	95
		74	156	192	174	1.86	93	3	132	92
	L	73	255	262	259	1.63	158	1	152	93
30/0/70	U	53	249	224	237	1.66	142	1	136	111
1000	L	75	178	154	166	1.70	97	3	138	91
		76	129	142	135	1.57	85	3	121	71
2000	U	55	219	121	170	1.59	106	3	150	85
		56	306	269	187	1.76	106	1	102	75
	L	77	---	---	---	----	---	-	---	---
		78	156	110	133	1.84	72	3	102	84
2/20/78	U	57	180	---	180	1.85	97	3	138	109
1000		58	---	---	---	----	---	-	---	---
	L	79	---	---	---	----	---	-	---	---
		80	179	187	183	1.68	108	1	104	100
2000	U	59	169	197	183	1.81	101	3	143	100
		60	143	99	121	1.96	61	3	86	75
	L	81	236	197	217	1.80	120	1	115	72
		82	215	---	215	1.71	125	1	120	82
15/52/33	U	61	176	199	187	1.86	100	3	142	122
1000		62	254	260	257	1.85	138	1	133	97
	L	83	203	217	210	1.72	122	1	117	84
		84	166	141	153	1.76	86	3	122	124
2000	U	63	231	172	201	1.91	105	3	149	118
		64	204	176	190	1.94	97	3	138	110
	L	85	313	287	300	1.82	164	1	158	108
		86	193	206	199	1.69	117	1	112	63
3000	U	65	204	175	189	1.94	97	3	138	76
		66	293	348	321	1.96	163	1	157	112
	L	87	---	---	---	----	---	-	---	---
		88	---	---	---	----	---	-	---	---

TABLE AII.294

RESTING CARBON DIOXIDE PRODUCTION: EXP II, HARD WORK
(Factors: Unit 1 = 0.961; Unit 3 = 1.419)

Diet	Water	Subject	ml/CO2/min Run 1	Run 2	$\bar{X}$	S.A.	ml/CO_2/M^2/min	Unit No.	Corrected ml/CO_2/M^2/min	% of PRE II
ST O	U	1	141	138	139	1.66	84	3	119	94
		3	234	230	232	1.64	141	3	200	102
	L	23	202	161	181	1.85	98	1	94	51
		24	125	171	148	1.50	99	3	140	118
		25	221	224	223	1.72	130	1	125	85
0/100/0	U	5	306	297	301	1.64	183	1	176	111
1000	L	27	186	173	179	1.52	118	3	167	89
2000	U	7	363	284	323	1.86	174	1	167	98
	L	29	207	196	201	1.89	106	3	150	81
30/0/70	U	9	187	232	209	1.92	109	1	105	86
1000	L	31	291	285	288	2.00	144	3	204	171
2000	U	11	188	334	261	1.75	149	1	143	120
	L	33	255	198	227	1.71	133	3	189	109
2/20/78	L	35	190	141	165	1.67	99	1	95	77
1000										
2000	U	15	211	209	210	1.85	113	1	109	105
	L	37	192	207	199	1.74	114	3	162	109
15/52/33	U	17	284	189	237	2.03	117	3	166	122
1000	U	19	210	231	221	1.62	136	1	131	96
FRA		90	322	357	339	1.95	174	1	167	
		91	290	259	275	2.02	136	3	193	
		94	337	296	317	2.00	159	1	153	

TABLE AII.295

RESTING CARBON DIOXIDE PRODUCTION, RECOVERY, FRA SUBJECTS
CALCULATION OF CORRECTION FACTORS

Subject Number	Mean Observed ($ml/CO_2/M^2/min$)	Unit Number	Corrected ($ml/CO_2/M^2/min$)
90	151	1	146
91	172	1	166
92	167	3	161
94	155	3	150
95	153	1	147
96	134	3	129
97	149	1	144
98	161	3	155
99	157	1	151
100	89*	3	94
101	145	1	140

* Subject 100 omitted from calculation because of aberrant results.

	Unit 1	Unit 3
Mean	155	154
Range	145-172	134-167
Factor	$\frac{149}{155} = 0.964$	$\frac{149}{154} = 0.966$

TABLE AII.296

RESTING CARBON DIOXIDE PRODUCTION: RECOVERY, HARD WORK
(Factors: Unit 1 = 0.964; Unit 3 = 0.966)

Diet	Water	Subject	ml/CO_2/min Run 1	Run 2	$\bar{X}$	S.A.	ml/CO_2/M^2/min	Unit No.	Corrected ml/CO_2/M^2/min	% of PRE II
ST 0	U	1	267	289	278	1.70	163	1	157	125
		2	386	330	358	1.84	194	1	FRA	---
		3	444	385	415	1.67	249	1	240	122
		4	370	418	394	1.94	203	1	196	124
	L	23	360	388	394	1.88	199	3	192	104
		24	---	---	---	---	---	-	---	---
		25	176	319	247	1.76	140	3	135	92
		26	366	278	322	1.55	208	3	201	103
0/100/0 1000	U	5	348	311	329	1.68	196	1	FRA	---
		6	333	375	354	1.78	199	1	192	119
	L	27	330	284	307	1.54	199	3	192	103
		28	257	260	259	1.70	152	3	147	113
2000	U	7	518	396	457	1.88	243	1	234	138
		8	373	309	341	1.68	203	1	196	109
	L	29	375	329	352	1.90	185	3	179	96
		30	205	211	208	1.79	116	3	112	87
30/0/70 1000	U	9	368	378	373	1.95	191	1	184	151
		10	336	324	330	1.73	191	1	184	141
	L	31	439	494	467	1.90	246	3	FRA	---
		32	325	170	247	1.73	143	3	138	76
2000	U	11	308	364	336	1.78	189	1	182	153
		12	417	368	393	1.89	208	1	201	149
	L	33	370	340	355	1.74	204	3	197	114
		34	---	201	201	1.66	121	3	117	85
2/20/78 1000	U	13	---	---	---	---	---	-	---	---
		14	305	338	321	1.78	180	1	173	138
	L	35	266	267	267	1.70	157	1	151	123
		36	202	248	225	1.73	130	3	126	111
2000	U	15	---	---	---	---	---	-	---	---
		16	---	---	---	---	---	-	---	---
	L	37	290	285	287	1.76	163	3	157	105
		38	312	289	301	1.82	165	1	159	99
15/52/33 1000	U	17	281	213	247	2.02	122	3	118	87
		18	266	267	267	1.72	155	3	150	127
	L	39	312	289	301	1.82	165	1	159	147
		40	353	390	371	1.90	195	3	FRA	---
2000	U	19	381	350	365	1.64	223	1	215	158
		20	---	---	---	---	---	-	---	---
	L	41	194	197	195	1.71	114	3	FRA	---
		42	327	313	320	1.79	179	1	173	125
3000	U	21	359	281	320	1.78	180	1	174	133
		22	313	302	307	1.68	183	1	176	93
	L	43	352	337	345	1.76	196	3	189	123
		44	256	244	250	1.77	141	3	136	79

TABLE AII.297

RESTING CARBON DIOXIDE PRODUCTION: RECOVERY, LIGHT WORK
(Factors: Unit 1 = 0.964; Unit 3 = 0.966)

Diet	Water	Subject	ml/CO_2/min Run 1	ml/CO_2/min Run 2	$\bar{X}$	S.A.	ml/CO_2/M^2/min	Unit No.	Corrected ml/CO_2/M^2/min	% of PRE II
ST 0	U	45	255	237	246	1.76	140	1	135	92
		46	337	367	352	1.88	187	1	180	141
		47	372	278	325	1.75	186	1	179	119
		48	408	352	380	1.94	196	1	189	112
		54	414	310	362	1.72	210	1	202	144
	L	67	270	250	260	1.70	153	3	148	97
		68	---	---	---	----	---	-	---	---
		69	211	229	220	1.80	122	3	118	64
		70	358	308	333	1.80	185	3	179	91
0/100/0 1000	U	49	306	278	292	1.76	166	1	160	98
		50	394	396	393	1.62	235	1	226	140
	L	71	236	226	231	1.72	134	3	129	91
		72	230	178	204	1.81	113	3	109	82
2000	U	51	366	285	325	2.00	163	1	157	106
		52	333	413	373	1.87	199	1	192	141
	L	73	---	---	---	----	---	-	---	---
		74	268	---	268	1.92	139	3	134	93
30/0/70	U	53	216	265	241	1.67	144	1	139	113
1000	L	75	295	345	320	1.74	184	3	178	118
		76	178	215	197	1.59	124	3	120	71
2000	U	55	315	375	345	1.62	213	3	206	116
		56	448	385	417	1.80	232	1	224	166
	L	77	---	---	---	----	---	-	---	---
		78	439	156	297	1.90	156	3	151	125
2/20/78	U	57	253	252	253	1.85	137	3	132	105
1000		58	309	250	279	1.79	156	1	FRA	---
	L	79	262	284	273	1.70	161	1	155	103
		80	220	154	187	1.69	111	3	107	103
2000	U	59	312	284	298	1.82	164	1	158	110
		60	397	250	323	1.96	105	1	159	138
	L	81	131	145	138	1.82	76	3	73	46
		82	352	280	366	1.74	210	1	202	137
15/52/33	U	61	290	310	300	1.87	160	1	154	133
1000		62	---	---	---	----	---	-	---	---
	L	83	183	185	184	1.74	106	3	102	73
		84	278	305	291	1.76	165	3	159	162
2000	U	63	408	357	383	1.92	199	1	192	152
		64	308	294	301	1.94	155	1	149	119
	L	85	262	124	193	1.84	105	3	101	69
		86	229	257	243	1.70	143	3	138	77
3000	U	65	256	263	259	1.95	133	3	128	71
		66	315	326	321	1.96	164	1	158	113
	L	87	323	314	319	2.10	152	1	FRA	---
		88	---	---	---	----	---	-	---	---

TABLE AII.298

RESTING RESPIRATORY QUOTIENT: HARD WORK

Diet	Water	Subject	PRE I RQ	PRE I % of Pre II	EXP I RQ	EXP I % of Pre II	REC II RQ	REC II % of Pre II	PRE II RQ
ST 0	U	1	0.95	138	0.65	94	1.03	149	0.69
		2	0.81	116	0.56	80	1.08	FRA	0.70
		3	0.76	75	0.61	60	1.08	107	1.01
		4	0.81	116	1.02	145	1.04	149	0.70
	L	23	0.66	50	0.88	66	0.98	74	1.33
		24	0.66	94	0.85	121	----	---	0.70*
		25	0.83	92	0.77	85	0.91	101	0.90
		26	0.68	67	0.63	62	0.85	83	1.02
0/100/0 1000	U	5	0.95	90	0.76	72	0.87	FRA	1.06
		6	0.82	85	0.56	58	1.04	108	0.96
	L	27	0.68	106	0.98	153	0.68	106	0.64
		28	0.93	133	0.94	134	1.00	143	0.70
2000	U	7	0.61	57	1.20	112	1.24	116	1.07
		8	0.83	76	0.95	87	0.94	86	1.09
	L	29	0.78	67	0.90	77	0.81	70	1.16
		30	0.85	106	1.21	151	0.67	84	0.80
30/0/70 1000	U	9	0.44	58	0.63	83	0.96	126	0.76
		10	0.59	88	0.59	88	0.90	134	0.67
	L	31	0.83	120	0.87	126	----	FRA	0.69
		32	0.95	89	0.87	81	0.93	87	1.07
2000	U	11	0.88	116	0.74	97	0.91	120	0.76
		12	0.79	101	0.66	85	0.94	121	0.78
	L	33	0.77	69	0.99	89	0.74	67	1.11
		34	0.75	86	1.00	115	0.71	82	0.87
2/20/78 1000	U	13	0.74	64	0.87	75	----	---	1.16
		14	1.56	214	0.98	134	0.92	126	0.73
	L	35	0.48	53	0.57	63	0.89	98	0.91
		36	0.87	145	1.16	193	0.79	132	0.60
2000	U	15	0.88	114	0.62	81	----	---	0.77
		16	----	---	0.33	60	----	---	0.55
	L	37	0.87	75	0.95	82	0.73	63	1.16
		38	0.91	99	0.99	108	0.98	107	0.92
15/52/33 1000	U	17	0.90	114	0.62	78	0.80	101	0.79
		18	----	---	0.59	76	----	---	0.78
	L	39	0.60	95	0.94	149	----	---	0.63
		40	0.50	60	----	---	----	FRA	0.83
2000	U	19	0.80	78	0.75	73	1.00	97	1.03
		20	1.02	101	0.77	76	----	---	1.01
	L	41	----	---	----	---	----	FRA	1.15
		42	1.04	142	1.33	182	0.99	136	0.73
3000	U	21	0.46	92	0.76	152	0.72	144	0.50
		22	1.19	127	1.29	137	1.02	108	0.94
	L	43	0.55	60	0.91	99	0.77	84	0.92
		44	0.66	68	0.84	87	0.68	70	0.97

* Flight mean of O_2 used

TABLE AII.299

RESTING RESPIRATORY QUOTIENT: LIGHT WORK

Diet	Water	Subject	PRE I RQ	PRE I % of Pre II	EXP I RQ	EXP I % of Pre II	REC II RQ	REC II % of Pre II	PRE II RQ
ST 0	U	45	0.94	101	0.71	76	1.03	111	0.93
		46	0.91	107	0.70	82	0.92	108	0.85
		47	0.83	89	0.64	69	1.04	112	0.93
		48	0.82	82	0.59	59	1.03	103	1.00
		54	0.63	71	0.33	37	1.09	122	0.89
	L	67	0.93	127	0.59	81	0.89	122	0.73
		68	0.81	97	0.87	105	----	---	0.83
		69	0.90	76	0.79	67	0.82	69	1.18
		70	1.01	103	0.71	72	0.78	79	0.98
0/100/0	U	49	0.94	112	0.77	92	0.90	107	0.84
1000		50	0.88	88	1.13	113	0.96	96	1.00
	L	71	0.75	90	0.82	99	0.78	94	0.83
		72	0.85	102	0.77	93	0.78	94	0.83
2000	U	51	0.46	52	1.14	128	0.95	107	0.89*
		52	0.92	118	1.07	137	1.07	137	0.78
	L	73	0.86	99	0.86	99	----	---	0.87
		74	0.90	93	0.83+	85	0.90	93	0.97
30/0/70	U	53	0.88	124	0.49	69	0.94	132	0.71
1000	L	75	0.55	72	0.76	100	0.85	112	0.76
		76	0.93	87	0.61	57	0.68	63	1.07
2000	U	55	0.88	100	0.93	106	0.85	97	0.88
		56	0.98	117	0.54	64	1.08	129	0.84
	L	77	0.92	107	----	---	----	---	0.86
		78	0.87	132	0.39	59	0.68	103	0.66
2/20/78	U	57	0.82	93	0.85	97	0.85	97	0.88
1000		58	1.01	107	----	---	----	FRA	0.94
	L	79	0.73	91	----	---	0.93	116	0.80
		80	0.56	83	----	---	0.66	99	0.67
2000	U	59	----	---	0.80	93	0.88	102	0.86*
		60	0.81	95	0.39	46	0.91	107	0.85
	L	81	0.74	84	0.70	80	0.57	65	0.88
		82	0.80	95	0.75	89	0.95	113	0.84*
15/52/33	U	61	0.91	108	0.87	103	1.03	123	0.84
1000		62	0.77	95	0.98	121	----	---	0.81
	L	83	0.63	129	0.65	112	0.84	141	0.71
		84	0.75	95	0.65	92	0.82	119	0.58
2000	U	63	0.75	95	0.73	92	0.94	119	0.79
		64	0.66	88	0.78	104	0.80	107	0.75
	L	85	0.85	106	0.79	99	0.89	111	0.80
		86	1.02	100	0.47	46	0.66	65	1.02
3000	U	65	0.85	93	0.74	81	0.67	74	0.91
		66	0.70	97	----	---	----	---	0.72
	L	87	0.86	91	----	---	----	FRA	0.94
		88	0.36	45	----	---	----	---	0.80

*Flight mean of O_2 or CO_2 or both used + Water Unlimited

TABLE AII.300

PULMONARY VENTILATION: FLIGHT 1
(L/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
1	5.322	5.445	4.651	4.024	5.813
2	7.408	8.222	6.939	-----	8.098
3	6.510	6.750	5.795	6.463	7.981
4	6.868	7.583	7.269	-----	7.794
5	8.088	6.926	6.905	6.291	7.774
6	7.397	6.470	5.636	-----	8.295
7	7.548	12.617	9.293	8.400	11.725
8	6.875	7.173	7.281	-----	7.008
9	6.344	7.260	7.045	5.076	7.772
10	6.474	7.156	6.707	-----	7.210
11	7.804	7.099	6.935	5.982	7.468
12	7.243	7.361	6.811	-----	7.834
13	5.851	10.536	6.016	-----	-----
14	9.304	8.296	7.443	-----	7.664
15	5.562	6.764	5.830	5.268	-----
16	4.780	6.565	5.599	-----	-----
17	6.906	6.786	5.698	7.087	10.899
18	6.651	7.159	6.430	-----	6.902
19	5.874	6.552	6.084	5.629	6.837
20	8.758	5.994	5.753	-----	-----
21	7.472	7.380	8.466	-----	9.238
22	8.970	8.374	9.386	-----	7.033
90	6.900	6.324	8.160	8.721	7.685
91	6.263	7.890	7.295	6.928	7.318
92	7.616	5.612	6.784	-----	6.269

TABLE AII.301

PULMONARY VENTILATION: FLIGHT 2
(L/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
23	8.116	8.693	6.325	5.245	8.919
24	6.300	4.702	5.030	4.364	-----
25	7.344	7.178	5.630	5.994	8.532
26	7.161	8.854	6.074	-----	10.494
27	7.237	7.006	6.071	5.230	7.271
28	7.120	6.262	4.366	-----	7.404
29	7.112	7.087	5.182	5.286	7.326
30	(6.89)	6.842	5.491	-----	6.360
31	6.672	7.147	7.434	7.027	8.954
32	9.326	8.057	9.207	-----	7.882
33	7.071	7.600	8.039	7.465	7.156
34	6.812	6.408	6.746	-----	6.603

TABLE AII.301 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
35	5.188	5.164	4.859	4.794	6.439
36	5.916	4.435	7.186	-----	5.424
37	6.111	6.373	5.843	6.432	6.585
38	8.744	6.018	5.865	-----	5.762
39	5.214	5.580	5.725	-----	-----
40	7.211	7.499	-----	-----	6.708
41	3.250	7.283	-----	-----	5.910
42	9.858	8.618	11.604	-----	7.892
43	5.792	6.189	5.091	-----	7.102
44	7.216	8.775	7.286	-----	7.867
93	6.087	-----	-----	-----	-----
94	8.136	7.506	7.362	7.878	8.477
95	5.744	5.641	5.782	-----	7.008
102	-----	-----	-----	-----	5.924

TABLE AII.302

PULMONARY VENTILATION: FLIGHT 3
(L/min)

Subject Code No.	P I	P II	EXP I	REC II
45	7.142	6.351	5.831	6.128
46	6.968	6.904	6.083	7.792
47	6.937	7.520	5.472	7.188
48	9.292	8.850	8.027	10.314
49	6.419	6.435	5.993	6.853
50	7.032	6.141	6.768	7.977
51	7.142	7.764	8.163	7.635
52	9.089	7.710	6.788	7.598
53	4.792	5.586	6.547	6.230
54	6.046	7.142	4.923	9.974
55	6.783	7.270	8.435	7.819
56	7.674	7.894	7.320	9.842
57	6.971	7.568	6.487	8.752
58	8.478	7.346	-----	6.624
59	(7.23)	(7.18)	6.156	6.701
60	7.342	7.003	5.844	7.377
61	7.520	6.087	5.606	6.160
62	7.006	7.832	6.782	-----
63	7.067	7.023	7.288	7.462
64	6.031	6.119	5.423	6.540
65	7.774	9.163	6.445	6.688
66	8.384	7.144	7.294	7.390
96	8.212	7.836	7.113	7.563
97	5.866	6.628	6.493	5.828
98	6.964	6.522	6.590	6.468

TABLE AII.303

PULMONARY VENTILATION: FLIGHT 4
(L/min)

Subject Code No.	P I	P II	EXP I	REC II
67	5.968	6.764	5.772	7.718
68	5.463	6.427	5.642	-----
69	7.516	8.344	7.557	8.053
70	8.102	8.692	7.170	9.766
71	5.526	6.217	4.974	6.660
72	8.024	7.408	6.133	8.655
73	7.148	7.210	6.597	-----
74	7.133	6.588	6.733	6.367
75	6.674	6.650	6.841	8.155
76	7.157	6.420	9.057	6.738
77	7.436	7.134	-----	-----
78	7.982	10.000	9.014	10.591
79	6.312	6.062	5.455	6.117
80	5.357	6.333	4.963	5.954
81	5.340	6.330	5.506	6.582
82	6.234	(6.79)	3.964	7.688
83	5.712	5.579	4.942	5.878
84	7.112	6.383	5.561	6.893
85	8.197	7.201	7.126	6.894
86	6.790	6.967	5.708	7.194
87	7.405	7.039	-----	7.420
88	6.372	6.708	-----	-----
99	6.543	6.926	6.136	6.739
100	6.440	5.157	7.560	6.254
101	6.196	6.699	6.603	6.645

TABLE AII.304

MAXIMAL VENTILATION CAPACITY: FLIGHT 1
(Liters)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
1	10.000	18.346	14.958	13.075	24.886
2	23.480	22.716	8.529	-----	20.193
3	15.254	16.680	19.433	23.693	21.699
4	19.556	22.602	32.419	-----	31.891
5	19.797	22.542	25.482	24.419	31.847
6	20.727	21.520	26.774	-----	28.543
7	23.875	22.736	16.215	26.921	34.462
8	19.205	29.327	25.808	-----	31.238
9	13.625	19.459	25.785	21.397	31.359
10	30.681	27.284	24.942	-----	29.294
11	15.122	20.719	28.786	-----	34.517
12	27.730	33.397	30.282	-----	37.497

TABLE AII.304 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
13	17.731	21.811	29.644	-----	-----
14	21.186	26.077	20.906	-----	25.572
15	20.254	24.448	24.134	29.454	-----
16	15.347	25.238	22.516	-----	-----
17	18.662	(23.44)	31.588	24.065	25.849
18	24.863	35.355	33.752	-----	34.800
19	24.089	21.314	35.106	22.190	28.110
20	20.165	18.658	31.321	-----	-----
21	23.027	21.522	26.534	-----	28.458
22	22.769	20.526	23.539	-----	32.207
90	13.232	31.588	25.425	31.920	42.513
91	28.042	26.280	34.328	30.573	34.181
92	20.380	22.966	28.409	-----	27.422

TABLE AII.305

MAXIMAL VENTILATION CAPACITY: FLIGHT 2
(Liters)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
23	13.998	17.784	18.281	16.129	31.741
24	13.282	26.825	20.969	18.610	-----
25	18.097	26.017	29.322	-----	31.024
26	20.935	25.723	17.135	-----	24.992
27	18.454	24.141	24.204	19.800	29.541
28	25.622	28.131	25.683	-----	20.988
29	16.633	20.119	21.541	20.874	25.259
30	(18.35)	21.079	26.319	-----	25.506
31	18.752	37.793	33.093	29.815	32.669
32	23.979	8.342	8.125	-----	20.025
33	16.576	23.656	20.398	28.462	26.749
34	15.808	32.302	24.636	-----	30.426
35	19.529	25.890	23.259	21.364	33.039
36	21.596	31.173	27.690	-----	20.917
37	20.907	22.947	25.073	25.042	25.956
38	15.541	22.568	33.575	-----	42.592
39	9.833	18.850	15.518	-----	-----
40	15.481	17.076	-----	-----	21.026
41	12.872	17.260	-----	-----	18.598
42	25.130	31.998	27.731	-----	40.580
43	22.014	25.034	31.619	-----	26.782
44	20.298	24.048	17.520	-----	24.830
93	19.019	-----	-----	-----	-----
94	11.592	23.218	17.685	22.109	29.097
95	20.019	24.582	23.152	-----	28.518
102	-----	-----	-----	-----	30.878

TABLE AII.306

MAXIMAL VENTILATION CAPACITY: FLIGHT 3
(Liters)

Subject Code No.	P I	P II	EXP I	REC II
45	16.423	14.281	31.810	32.769
46	17.159	27.971	28.603	34.950
47	23.008	25.926	29.942	30.547
48	23.958	23.064	19.526	36.058
49	17.437	26.866	34.020	31.934
50	19.225	21.395	27.905	26.088
51	14.952	17.317	17.373	28.802
52	17.028	23.538	28.237	29.303
53	34.822	28.626	27.392	31.283
54	19.727	25.604	22.760	35.839
55	11.030	24.329	24.291	27.103
56	22.316	26.254	28.736	21.883
57	19.113	34.982	26.787	23.609
58	20.331	17.028	-----	20.326
59	(20.41)	(23.11)	10.724	19.198
60	16.558	18.258	22.959	21.335
61	23.806	20.982	23.016	34.508
62	15.427	17.713	20.280	-----
63	22.552	21.059	26.660	28.474
64	33.528	28.071	27.121	34.001
65	20.199	24.356	28.352	28.195
66	19.986	17.466	-----	19.682
96	16.563	21.746	25.289	30.150
97	19.683	20.940	26.326	18.544
98	30.484	18.313	28.547	27.923

TABLE AII.307

MAXIMAL VENTILATION CAPACITY: FLIGHT 4
(Liters)

Subject Code No.	P I	P II	EXP I	REC II
67	12.294	28.233	23.774	26.152
68	20.399	26.154	20.228	-----
69	29.487	36.169	26.317	23.767
70	14.011	23.066	23.450	27.110
71	15.308	14.956	16.650	20.350
72	25.035	23.586	25.312	22.326
73	19.972	19.967	28.277	-----
74	27.945	34.904	32.913	35.533
75	13.921	29.421	20.993	26.605
76	17.838	23.099	21.465	27.791
77	28.137	27.557	-----	-----
78	17.288	18.846	16.324	14.858

TABLE AII.307 (Contd)

Subject Code No.	P I	P II	EXP I	REC II
79	18.893	19.781	15.287	28.526
80	22.750	29.453	30.422	30.828
81	25.685	30.316	39.635	31.886
82	20.227	(26.29)	25.902	21.579
83	28.163	23.351	34.777	27.080
84	31.325	32.431	20.876	29.340
85	21.111	28.549	29.673	28.918
86	14.965	29.951	27.469	33.696
87	8.934	30.630	-----	16.480
88	19.239	21.334	-----	-----
99	20.838	26.706	32.180	27.811
100	17.869	19.870	23.264	28.980
101	18.947	20.349	20.238	16.418

TABLE AII.308

RESPIRATORY RATE (METABOLISM TEST): FLIGHT 1
(Breaths/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
1	14	12	15	11	12
2	20	24	18	--	18
3	19	15	14	18	16
4	14	9	11	--	10
5	16	16	16	18	16
6	16	14	13	--	16
7	18	18	14	18	15
8	18	16	18	--	20
9	15	15	16	14	16
10	20	18	22	--	19
11	22	20	17	14	15
12	14	12	12	--	18
13	14	13	12	--	--
14	21	16	19	--	17
15	10	14	14	14	--
16	14	14	19	--	--
17	15	15	18	18	14
18	16	14	12	--	14
19	13	16	17	18	16
20	14	18	21	--	--
21	22	26	26	--	28
22	10	8	10	--	12
90	18	15	25	19	19
91	11	12	11	11	16
92	22	14	16	--	15

TABLE AII.309

RESPIRATORY RATE (METABOLISM TEST): FLIGHT 2
(Breaths/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
23	18	22	12	20	18
24	12	12	12	15	--
25	11	14	16	17	15
26	20	24	20	--	24
27	16	16	15	20	18
28	9	12	9	--	11
29	10	12	12	12	14
30	(14)	16	15	--	12
31	13	14	13	16	17
32	18	12	27	--	16
33	16	17	18	17	16
34	23	19	21	--	22
35	17	14	18	17	22
36	14	10	8	--	10
37	16	17	20	19	16
38	9	7	8	--	6
39	12	14	18	--	--
40	13	14	--	--	14
41	10	13	--	--	9
42	18	18	20	--	18
43	10	8	10	--	13
44	16	20	26	--	20
93	14	--	--	--	--
94	20	20	18	18	26
95	15	14	17	--	15
102	--	--	--	--	16

TABLE AII.310

RESPIRATORY RATE (METABOLISM TEST): FLIGHT 3
(Breaths/min)

Subject Code No.	P I	P II	EXP I	REC II
45	12	13	18	18
46	16	18	17	14
47	16	17	16	16
48	16	18	26	17
49	12	13	15	16
50	10	11	10	18
51	14	16	22	16
52	18	17	16	16
53	18	14	24	20
54	16	16	14	21
55	19	20	24	22
56	18	20	19	19

TABLE AII.310 (Contd)

Subject Code No.	P I	P II	EXP I	REC II
57	16	21	21	18
58	14	17	—	14
59	(16)	(16)	15	16
60	20	20	15	16
61	17	14	14	14
62	16	18	18	—
63	18	22	20	16
64	10	8	10	7
65	15	14	10	12
66	16	18	19	14
96	16	13	16	16
97	12	12	14	16
98	14	16	16	12

TABLE AII.311

RESPIRATORY RATE (METABOLISM TEST): FLIGHT 4
(Breaths/min)

Subject Code No.	P I	P II	EXP I	REC II
67	12	14	18	16
68	13	17	18	—
69	16	16	20	14
70	14	16	16	14
71	12	14	11	12
72	17	16	16	14
73	18	14	15	—
74	12	12	14	11
75	16	9	19	18
76	9	10	12	10
77	25	22	—	—
78	22	46	35	27
79	18	14	16	16
80	20	20	20	21
81	9	13	13	14
82	10	(17)	10	11
83	16	17	18	14
84	19	14	17	14
85	26	21	21	21
86	20	17	16	18
87	14	21	—	18
88	12	14	—	—
99	16	14	14	12
100	14	18	18	14
101	12	10	19	9

TABLE AII.312

TIDAL VOLUME: FLIGHT 1
(ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
1	395	444	310	366	466
2	382	346	386	450	---
3	354	452	364	372	501
4	478	816	667	---	768
5	506	447	445	351	488
6	480	450	365	---	503
7	431	701	693	483	782
8	392	448	374	---	362
9	423	484	441	350	507
10	334	336	301	---	402
11	356	368	408	443	498
12	595	651	570	---	436
13	404	842	484	---	---
14	440	507	395	---	455
15	578	506	416	367	---
16	352	488	295	---	---
17	460	463	327	394	779
18	431	517	524	---	517
19	462	424	358	316	428
20	611	343	275	---	---
21	348	282	328	---	337
22	946	1038	874	---	589
90	376	415	326	478	406
91	571	634	670	636	445
92	362	400	438	---	418

TABLE AII.313

TIDAL VOLUME: FLIGHT 2
(ml)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
23	441	396	542	261	483
24	516	378	402	292	---
25	695	332	342	352	584
26	360	369	296	---	447
27	403	426	410	270	393
28	822	502	510	---	683
29	729	617	452	429	543
30	(516)	414	381	---	534
31	590	510	561	466	527
32	530	700	341	---	477
33	429	447	461	452	434
34	287	344	327	---	320

TABLE AII.313 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
35	306	383	270	286	349
36	408	444	865	---	559
37	384	376	294	339	413
38	968	824	716	---	888
39	437	414	327	---	---
40	554	556	---	---	463
41	326	560	---	---	660
42	562	482	580	---	462
43	610	760	500	---	551
44	472	442	280	---	396
93	421	---	---	---	---
94	408	386	298	430	367
95	387	426	353	---	474
102	---	---	---	---	382

TABLE AII.314

TIDAL VOLUME: FLIGHT 3
(ml)

Subject Code No.	P I	P II	EXP I	REC II
45	645	490	333	340
46	425	376	358	556
47	435	442	332	464
48	580	483	302	606
49	579	495	401	416
50	670	558	646	444
51	512	486	382	463
52	506	455	423	477
53	273	397	280	322
54	380	465	351	489
55	352	351	343	364
56	426	404	385	520
57	450	360	308	474
58	536	434	---	499
59	(483)	(441)	412	409
60	376	350	377	487
61	448	440	386	425
62	428	426	387	---
63	407	336	340	482
64	652	764	518	964
65	520	657	569	558
66	542	400	407	570
96	518	607	432	492
97	469	578	464	365
98	500	422	411	563

TABLE AII.315

TIDAL VOLUME: FLIGHT 4
(ml)

Subject Code No.	P I	P II	EXP I	REC II
67	478	467	302	473
68	420	384	305	---
69	474	516	386	556
70	561	576	464	711
71	460	446	452	534
72	474	464	428	587
73	411	542	438	---
74	596	547	499	585
75	431	768	360	469
76	758	614	792	641
77	246	328	---	---
78	368	218	269	400
79	364	418	314	394
80	322	317	255	283
81	611	490	423	454
82	636	(451)	419	718
83	351	327	278	406
84	374	487	327	488
85	322	344	339	300
86	368	411	368	400
87	532	335	---	412
88	526	479	---	---
99	426	514	455	549
100	464	283	432	431
101	540	663	712	767

TABLE AII.316

RESTING ORAL TEMPERATURE: FLIGHT 1
(°F)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	99.7	97.7	97.7	97.7	97.2	97.8
2	97.8	97.2	----	----	----	97.0
3	97.7	97.6	97.8	99.8	98.4	97.2
4	97.8	97.4	97.6	99.2	97.6	97.4
5	98.2	98.0	97.8	----	----	97.8
6	97.8	97.6	97.8	99.0	97.6	97.8
7	97.8	97.0	97.0	99.0	97.4	97.2
8	97.6	97.4	97.2	98.8	97.2	97.2
9	98.0	97.8	97.6	99.4	98.2	97.8
10	97.4	97.2	96.8	98.4	97.2	97.4
11	98.2	98.0	97.4	98.8	97.8	97.8
12	97.0	97.0	97.0	99.4	98.0	97.4

TABLE AII.316 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	97.7	97.4	97.2	----	----	----
14	97.3	97.0	97.0	98.4	97.4	97.0
15	96.6	97.2	97.4	99.4	100.2	----
16	97.8	97.1	97.4	----	----	----
17	97.7	(97.4)	97.4	98.2	97.8	97.8
18	97.6	97.8	97.4	98.6	97.6	97.8
19	98.4	97.6	97.6	99.0	97.8	99.2
20	97.0	97.3	97.0	----	----	----
21	98.0	97.8	98.0	99.4	98.0	97.8
22	98.0	97.3	97.6	98.6	97.8	97.6
90	96.8	97.1	97.4	99.4	97.2	97.0
91	97.7	97.4	97.6	98.4	97.6	97.8
92	97.7	97.2	97.2	98.0	97.6	97.6

TABLE AII.317

RESTING ORAL TEMPERATURE: FLIGHT 2
(oF)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	97.5	98.0	97.6	98.4	97.8	97.8
24	97.2	98.2	98.0	98.8	----	----
25	97.8	98.3	97.8	98.6	98.0	97.8
26	96.9	98.7	98.0	98.4	98.0	98.4
27	97.0	98.2	98.4	98.8	98.0	98.2
28	97.9	98.0	97.2	98.8	97.8	97.6
29	97.3	98.0	98.0	98.6	98.2	97.6
30	(97.3)	97.7	97.8	98.8	98.0	97.4
31	97.0	97.9	98.8	98.6	98.2	98.4
32	97.0	97.9	97.6	98.4	97.6	97.6
33	97.5	98.3	97.6	98.8	98.4	98.0
34	97.0	98.5	97.0	98.6	98.0	98.2
35	97.4	98.0	97.6	99.2	98.0	98.2
36	95.6	97.9	97.4	98.4	97.8	97.2
37	97.6	97.9	98.0	99.0	98.2	98.2
38	98.2	98.3	98.2	98.4	98.0	98.4
39	97.0	97.9	98.2	99.2	----	----
40	97.0	(98.0)	----	99.0	97.4	97.4
41	97.2	98.0	----	----	----	98.0
42	97.2	98.3	98.0	98.8	98.4	98.4
43	98.4	97.7	97.2	99.4	97.6	97.6
44	97.6	97.5	97.6	99.4	97.8	97.6
93	97.4	----	----	----	----	----
94	97.6	98.3	98.0	99.0	97.8	98.0
95	97.2	98.1	97.8	98.0	97.6	98.0
102	----	----	----	99.0	97.6	98.0

TABLE AII.318

RESTING ORAL TEMPERATURE: FLIGHT 3
(°F)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	98.4	97.8	97.8	97.4	97.6	97.6
46	99.4	99.0	97.0	98.6	98.0	97.8
47	98.4	97.2	97.2	97.6	97.4	97.0
48	98.4	97.8	97.6	98.4	97.6	97.8
49	98.4	97.4	97.4	98.4	98.2	98.0
50	98.2	97.6	97.6	97.6	97.4	97.4
51	97.6	97.6	97.0	97.4	97.6	97.4
52	96.8	97.8	97.8	98.2	98.0	97.4
53	98.0	97.6	97.4	98.0	97.6	97.2
54	98.1	97.6	97.6	97.6	97.4	97.4
55	97.6	97.6	97.6	98.2	97.4	97.6
56	98.2	97.6	97.4	98.2	97.4	97.6
57	98.2	97.4	98.0	98.0	97.6	97.4
58	99.1	100.0	----	98.1	98.0	98.0
59	(98.1)	(97.8)	97.8	97.6	97.2	97.2
60	98.0	97.4	97.2	97.6	97.2	97.2
61	98.0	97.6	97.6	97.8	97.4	97.0
62	97.8	97.6	97.0	97.6	96.8	96.8
63	99.4	97.6	97.4	98.0	97.2	96.4
64	97.6	97.6	97.2	98.6	97.6	97.2
65	97.2	97.2	97.6	97.6	97.8	96.8
66	98.0	98.0	97.4	97.6	97.4	96.4
96	97.6	97.2	97.8	97.4	97.2	97.4
97	98.0	98.2	97.4	97.8	97.4	97.0
98	97.6	97.6	98.0	97.6	97.6	97.4

TABLE AII.319

RESTING ORAL TEMPERATURE: FLIGHT 4
(°F)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	98.4	98.8	97.8	98.2	98.4	98.0
68	97.6	98.6	96.8	95.6	97.6	----
69	97.6	98.6	97.2	96.8	97.6	97.6
70	98.0	98.4	97.6	97.2	98.0	98.0
71	98.2	98.4	97.2	97.8	97.6	97.6
72	97.8	98.3	97.4	97.6	97.8	97.3
73	98.0	98.6	98.0	98.0	----	----
74	98.6	98.9	98.0	98.2	98.0	97.8
75	97.4	97.8	97.8	97.4	97.8	97.3
76	98.6	98.8	97.6	97.2	98.6	98.6
77	97.6	98.3	----	----	----	----
78	97.2	98.4	97.6	97.0	98.4	97.6

TABLE AII.319 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	97.6	98.6	96.8	97.6	96.8	97.6
80	97.4	98.3	96.4	96.6	97.6	97.4
81	97.6	97.8	97.2	97.0	97.2	97.4
82	(97.8)	98.1	97.6	----	----	98.2
83	98.0	98.3	97.8	97.6	98.0	97.8
84	98.0	98.4	98.0	98.0	97.8	98.0
85	97.6	98.6	97.5	97.6	97.6	97.6
86	98.2	98.9	98.0	98.2	98.2	98.0
87	97.4	98.2	----	----	----	98.0
88	97.8	98.2	----	----	----	----
99	97.0	98.1	97.0	97.2	98.0	97.3
100	98.0	98.3	98.0	97.0	97.8	97.8
101	98.2	97.0	98.4	97.2	98.6	98.6

TABLE AII.320

RESPIRATORY RATE (THREE-HOUR TEST): FLIGHT 1
(Breaths/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	18	20	16	14	15	12
2	18	18	--	--	--	12
3	17	16	18	29	20	19
4	17	15	16	17	20	28
5	18	14	14	--	--	14
6	15	15	16	18	15	19
7	17	14	18	16	12	18
8	15	15	18	17	14	17
9	15	14	15	19	15	19
10	19	22	24	28	19	21
11	14	18	18	24	18	22
12	18	15	17	28	17	19
13	14	14	16	--	--	--
14	22	18	18	22	20	19
15	13	15	14	19	14	--
16	17	14	14	--	--	--
17	20	(16)	20	18	24	18
18	11	18	24	21	22	14
19	12	16	16	17	18	13
20	15	17	16	--	--	--
21	20	20	14	14	18	13
22	16	19	14	18	20	16
90	20	21	21	15	19	17
91	17	16	16	16	16	17
92	15	17	18	18	17	18

TABLE AII.321

RESPIRATORY RATE (THREE-HOUR TEST): FLIGHT 2
(Breaths/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	16	14	13	19	15	16
24	15	15	26	18	—	—
25	15	18	14	18	16	14
26	20	19	21	20	25	18
27	11	20	19	18	18	18
28	14	17	14	12	15	14
29	11	9	16	12	16	14
30	(16)	16	18	20	22	16
31	14	16	19	12	23	12
32	17	14	14	20	16	16
33	16	18	19	28	—	18
34	17	15	18	18	18	14
35	14	18	18	26	16	18
36	15	15	9	9	9	10
37	20	17	18	22	19	18
38	14	14	12	11	11	10
39	17	20	18	14	—	—
40	16	(16)	—	16	13	15
41	17	19	—	—	—	15
42	13	17	20	18	15	16
43	15	14	13	22	18	13
44	19	17	17	28	23	20
93	16	—	—	—	—	—
94	15	23	18	20	20	20
95	15	19	17	16	17	21
102	—	—	—	28	19	15

TABLE AII.322

RESPIRATORY RATE (THREE-HOUR TEST): FLIGHT 3
(Breaths/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	18	12	24	18	11	11
46	(16)	16	20	14	10	14
47	16	15	28	18	12	14
48	16	14	16	20	16	17
49	14	17	15	16	16	18
50	15	(17)	19	20	18	22
51	14	(17)	21	17	22	16
52	14	16	14	13	17	15
53	17	17	19	20	15	17
54	16	19	23	12	19	20
55	18	17	25	20	18	18
56	18	20	16	20	20	16

TABLE AII.322 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	16	18	15	20	22	18
58	17	16	--	15	18	21
59	(16)	(17)	16	17	20	23
60	17	18	14	17	--	16
61	16	17	14	21	16	19
62	16	16	15	14	--	19
63	18	16	16	21	19	20
64	13	21	10	10	16	17
65	12	19	17	17	17	21
66	20	17	15	15	15	18
96	14	22	12	16	16	19
97	12	14	12	16	14	16
98	18	17	14	14	14	16

TABLE AII.323

RESPIRATORY RATE (THREE-HOUR TEST): FLIGHT 4
(Breaths/min)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	16	20	17	20	16	16
68	15	14	13	15	20	--
69	22	19	17	19	19	20
70	15	14	16	13	13	13
71	14	16	12	11	11	14
72	15	20	12	18	15	18
73	14	11	12	10	--	--
74	14	14	15	12	13	12
75	17	14	15	18	20	23
76	13	13	18	15	16	16
77	15	17	--	--	--	--
78	19	23	21	26	26	18
79	17	17	17	22	14	15
80	17	22	15	14	18	22
81	14	14	16	16	18	18
82	(16)	14	24	--	--	12
83	18	20	22	20	16	18
84	16	14	28	16	16	14
85	21	23	23	21	22	17
86	14	18	18	18	18	18
87	15	18	--	--	--	18
88	12	14	--	--	--	--
99	18	20	20	16	22	21
100	14	19	30	17	16	17
101	15	15	28	14	18	19

TABLE AII.324

PASSAGE OF TIME - 20 SECONDS: FLIGHT 1

Subject Code No.	P I	P II	EXP I	EXP II	REC II
1	9.5	9.6	6	8	7.1
2	28.0	14	15	----	30.9
3	21.6	21.5	14	17	17
4	3.2	3.0	4	----	4.5
5	14.2	18.1	23	23	17.5
6	10.5	20.6	18	----	14
7	13.0	19.5	28	10	37
8	10.6	10.7	9	----	14
9	13.9	21.9	21	17	10.8
10	6.9	11.0	14	----	15
11	9.2	8.1	8	10	9.2
12	12.0	18.3	14	----	12
13	14.5	16.8	14	----	----
14	6.4	7.5	11	----	13.5
15	16.8	11.4	20	18	----
16	4.6	6.9	18	----	----
17	3.4	12.5	22	22	17.5
18	10.9	11.5	14	----	19
19	8.2	8.3	14	15	19
20	4.7	6.8	7	----	----
21	12.6	16.4	16	----	13.1
22	23.3	13.7	16	----	17.1
90	11.2	5.5	6	12	12.2
91	9.2	20.0	19	21	19.5
92	3.2	8.6	16	----	11.4

TABLE AII.325

PASSAGE OF TIME - 20 SECONDS: FLIGHT 2

Subject Code No.	P I	P II	EXP I	EXP II	REC II
23	3.8	8.3	9	14	8.2
24	16.5	26.2	14	22	----
25	7.6	12.6	14	26	14
26	9.4	11.4	19	----	14.3
27	9.9	10.0	10	14	10.6
28	8.5	8.8	14	----	10
29	10.2	10.0	20	22	15.8
30	(9.8)	15.9	22	----	15
31	12.1	6.6	8	21	14.5
32	4.5	5.4	12	----	13
33	14.1	12.5	13	8	15
34	5.6	8.6	10	----	10

TABLE AII.325 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
35	16.8	18.4	16	16	15
36	16.2	4.6	9	----	7
37	7.5	7.2	20	7	8
38	10.3	13.0	23	----	12
39	9.3	8.7	20	----	----
40	11.0	11.0	----	----	8
41	4.6	14.3	----	----	11
42	12.0	6.8	10	----	9
43	13.2	14.2	15	----	14.5
44	2.0	9.8	8	----	27
93	11.8	----	----	----	----
94	16.5	22.4	19	22	19
95	9.5	11.1	13	----	30
102	----	----	----	----	14

TABLE AII.326

PASSAGE OF TIME - 20 SECONDS: FLIGHT 3

Subject Code No.	P I	P II	EXP I	REC II
45	13	14	19	17
46	15	25	30	19
47	15.3	14.1	11	18
48	18	52	14	11
49	9	14	8	14
50	50	12.0	11	8
51	6	9	9	8
52	14.4	13.0	13	14
53	19	17	15	18
54	10.4	18.4	18	26
55	15	35	28	19
56	22.5	23	19	28
57	19	24	19	14
58	11.5	8	--	14
59	(14.8)	(18.2)	16	16
60	7.1	10	13	11
61	11	29	16	18
62	4.7	6	3	--
63	21	19	13	15
64	14	16	16	14
65	4	9	5	6
66	12	13	17	19
96	12	18	18	16
97	10.8	16	17	19
98	7	24	24	15

TABLE AII.327

PASSAGE OF TIME - 20 SECONDS: FLIGHT 4

Subject Code No.	P I	P II	EXP I	REC II
67	16	19	22	23
68	11	13	16	--
69	4.4	11	14	14
70	11	11	11	14
71	3	11	16	14
72	8.5	9	18	16
73	7	20	16	--
74	14.8	12	18	18
75	25	18	20	17
76	23.7	17	17	13
77	16	16	--	--
78	8.2	8	20	21
79	8.5	12	19	10
80	3.8	7	7	13
81	14	19	23	38
82	8.3	(14.8)	4	6
83	15	24	14	15
84	20	12	11	14
85	5.5	21	25	17
86	13	18	20	21
87	10	14	--	10
88	13	15	--	--
99	11	23	30	23
100	9.4	14	20	19
101	8	10	20	18

TABLE AII.328

PASSAGE OF TIME - 45 SECONDS: FLIGHT 1

Subject Code No.	P I	P II	EXP I	EXP II	REC II
1	18.0	17.7	14	18	20.7
2	51.0	38	38	--	47.6
3	32.6	52.7	33	40	39
4	4.4	4.5	6	--	8.0
5	27.8	40.6	50	34	38.6
6	60.0	45.5	44	--	27
7	23.2	27.7	57	75	56
8	19.0	20.5	19	--	25
9	29.3	34.0	65	27	20.8
10	11.3	25.4	31	--	25
11	22.0	23.4	18	22	27.9
12	24.9	31.2	32	--	25
13	31.2	27.1	43	--	--

TABLE AII.328 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC II
14	15.2	25.6	28	--	26.0
15	15.4	29.2	29	39	--
16	9.5	17.3	44	--	--
17	4.5	23.5	28	42	54.9
18	26.6	33.1	44	--	51
19	16.8	24.1	29	41	45.5
20	7.0	12.2	14	--	--
21	33.4	31.5	46	--	22.0
22	40.7	28.4	32	--	28.5
90	10.9	19.1	17	20	25.5
91	31.9	40.5	39	38	44
92	12.5	16.5	37	--	26.6

TABLE AII.329

PASSAGE OF TIME - 45 SECONDS: FLIGHT 2

Subject Code No.	P I	P II	EXP I	EXP II	REC II
23	11.4	15.2	24	27	18.9
24	31.7	47.0	17	24	--
25	23.3	36.8	33	52	34
26	19.3	18.2	33	--	25
27	34.0	24.0	25	25	24.5
28.	17.7	18.3	58	--	28
29	19.0	37.8	44	51	39
30	(20.6)	29.8	30	--	25
31	21.0	14.3	18	44	34
32	13.9	18.7	28	--	30
33	21.5	29.1	34	28	41
34	8.4	25.8	24	--	23
35	35.4	39.8	38	35	35
36	23.3	12.4	30	--	18.5
37	8.7	16.7	24	37	72
38	22.6	39.1	32	--	31
39	18.9	18.0	31	--	--
40	26.3	18.3	--	--	15
41	20.0	28.8	--	--	24
42	18.9	13.3	18	--	12
43	34.8	32.0	31	--	32
44	2.2	11.0	32	--	62
93	23.1	----	--	--	--
94	14.0	44.8	47	58	49
95	15.0	32.3	37	--	79
102	----	----	--	--	44

TABLE AII.330

PASSAGE OF TIME - 45 SECONDS: FLIGHT 3

Subject Code No.	P I	P II	EXP I	REC II
45	22	27	41	40
46	63	57	45	76
47	25.5	27.1	24	43
48	46	62	28	24
49	18	40	15	32
50	19.8	21.4	23	24
51	11	15	20	22
52	23.1	28.5	30	39
53	38	43	46	42
54	31.7	40.5	43	35
55	33	55	43	50
56	54.8	61	58	38
57	28	47	42	26
58	30.8	24	--	27
59	(20.6)	(36.3)	46	43
60	23.2	28	31	21
61	39	42	37	25
62	6.0	6	6	--
63	25	38	22	36
64	29	35	39	34
65	8	37	12	16
66	23	27	37	46
96	53	37	36	40
97	30.3	41	47	45
98	18	42	46	43

TABLE AII.331

PASSAGE OF TIME - 45 SECONDS: FLIGHT 4

Subject Code No.	P I	P II	EXP I	REC II
67	75	35	52	47
68	19	18	37	--
69	13.6	21	31	28
70	23	34	26	31
71	18	29	34	37
72	28.3	22	43	29
73	11	41	48	--
74	31.2	36	25	44
75	45	37	40	39
76	53.8	34	33	29
77	38	28	--	--
78	10.8	11	45	34

TABLE AII.331 (Contd)

Subject Code No.	P I	P II	EXP I	REC II
79	15	32	29	36
80	8.9	12	18	27
81	36	38	49	32
82	11.8	(29.2)	14	15
83	30	35	27	25
84	24	20	26	26
85	32.1	37	39	28
86	24	37	41	62
87	13	17	--	23
88	35	40	--	--
99	36	74	44	78
100	20.0	31	42	41
101	37	36	38	30

TABLE AII.332

PASSAGE OF TIME - 70 SECONDS: FLIGHT 1

Subject Code No.	P I	P II	EXP I	EXP II	REC II
1	60.0	27.5	26	29	35.5
2	100.7	79	68	--	115
3	52.0	82.3	58	72	63
4	7.5	7.4	6	--	6.5
5	46.8	50.8	86	58	61.4
6	83.0	66.5	65	--	41
7	22.6	47.4	80	72	77
8	29.5	28.4	34	--	40
9	59.9	61.0	100	37	40.8
10	17.4	52.2	63	--	39
11	27.4	61.0	38	28	41.5
12	39.4	45.6	44	--	45
13	60.0	63.6	71	--	--
14	31.4	62.2	44	--	46.0
15	32.2	45.3	26	42	--
16	30.6	38.2	85	--	--
17	5.8	24.1	44	78	73.2
18	64.4	66.0	64	--	54
19	32.0	35.6	52	62	54.0
20	12.5	21.9	24	--	--
21	63.4	44.4	47	--	35.1
22	92.0	67.6	46	--	49.5
90	25.1	30.9	40	25	55.7
91	55.4	63.1	79	69	66
92	23.4	34.6	52	--	44.0

TABLE AII.333

PASSAGE OF TIME - 70 SECONDS: FLIGHT 2

Subject Code No.	P I	P II	EXP I	EXP II	REC II
23	54.6	29.0	42	46	31.5
24	60.7	64.2	43	41	--
25	81.0	80.4	60	73	55
26	28.4	33.1	43	--	33
27	44.5	43.6	35	40	37.4
28	27.3	31.7	61	--	44
29	51.6	78.0	74	78	64
30	(41.4)	61.0	47	--	54
31	61.1	28.4	40	70	46
32	20.4	24.5	40	--	33
33	34.0	49.5	50	52	55
34	19.0	42.6	40	--	39
35	51.8	62.5	81	56	50
36	46.2	36.0	48	--	33.5
37	23.9	19.8	34	74	67
38	37.0	35.2	80	--	62
39	58.3	33.4	71	--	--
40	47.5	21.2	--	--	33
41	33.8	40.5	--	--	34
42	28.2	16.9	25	--	16
43	57.0	51.6	56	--	54
44	3.3	14.1	69	--	115
93	42.3	----	--	--	--
94	39.0	63.5	76	104	72
95	23.3	46.8	59	--	89
102	----	----	--	--	63

TABLE AII.334

PASSAGE OF TIME - 70 SECONDS: FLIGHT 3

Subject Code No.	P I	P II	EXP I	REC II
45	69	56	73	56
46	110	56	68	120
47	43.1	40.0	42	64
48	84	83	40	34
49	56	54	65	54
50	27.2	34.0	34	46
51	18	31	59	33
52	40.2	52.8	47	70
53	96	75	78	76
54	63.0	55.2	74	64
55	79	72	74	75
56	80.4	95	84	75

TABLE AII.334 (Contd)

Subject Code No.	P I	P II	EXP I	REC II
57	80	75	72	49
58	43.9	43	--	50
59	(58.8)	(54.3)	69	70
60	37.4	34	46	31
61	84	65	60	46
62	9.3	18	8	--
63	96	43	36	73
64	51	51	46	52
65	19	39	24	36
66	49	69	67	70
96	72	62	65	72
97	59.1	70	76	62
98	40	82	63	76

TABLE AII.335

PASSAGE OF TIME - 70 SECONDS: FLIGHT 4

Subject Code No.	P I	P II	EXP I	REC II
67	90	54	78	74
68	32	48	68	--
69	37.9	39	47	42
70	38	64	31	38
71	85	48	76	54
72	50.8	51	77	46
73	22	69	77	--
74	54.8	59	56	62
75	85	69	61	54
76	64.0	50	53	44
77	92	37	--	--
78	22.0	45	68	61
79	33	32	38	40
80	19.7	18	27	46
81	105	56	77	71
82	23.0	(48.5)	17	17
83	50.2	56	38	60
84	60.9	27	43	38
85	49.5	49	92	61
86	82	65	59	89
87	45	38	--	34
88	55	45	--	--
99	95	102	64	81
100	28.5	38	34	38
101	61	33	40	54

TABLE AII.336

INITIAL RECTAL TEMPERATURE: FLIGHT 1
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	98.3	99.5	99.5	99.5	99.5
2	98.0	100.0	----	----	99.5
3	98.0	99.7	99.2	99.6	99.5
4	99.3	99.7	100.0	99.8	99.7
5	99.0	99.9	99.5	----	99.4
6	98.2	99.7	99.0	99.5	99.2
7	100.3	99.5	99.5	99.5	99.3
8	99.5	99.5	99.5	99.5	99.0
9	98.9	99.5	99.5	99.5	99.3
10	99.3	99.5	99.0	99.3	99.7
11	98.2	99.7	98.8	99.8	99.1
12	99.3	99.5	99.1	99.7	99.4
13	99.5	99.4	98.8	----	----
14	99.3	98.9	98.6	99.5	99.0
15	99.9	98.6	99.0	----	----
16	97.6	99.1	99.3	----	----
17	98.5	(99.5)	99.0	99.2	99.4
18	98.0	99.7	99.5	99.5	99.4
19	99.3	99.7	99.8	99.7	99.2
20	98.5	99.7	99.0	----	----
21	98.9	99.7	98.8	99.7	99.2
22	99.7	100.0	99.9	99.5	99.0
90	98.5	99.8	99.4	99.4	99.3
91	99.0	99.9	99.8	99.5	99.1
92	99.0	99.7	99.7	99.5	99.5

TABLE AII.337

INITIAL RECTAL TEMPERATURE: FLIGHT 2
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	97.9	99.5	99.0	99.3	98.8
24	100.1	99.7	99.1	----	----
25	99.7	99.5	98.7	99.5	99.0
26	99.1	99.7	98.5	99.5	99.0
27	98.0	----	99.0	98.7	99.1
28	99.2	99.7	98.7	99.7	99.0
29	100.3	99.9	99.0	99.5	99.0
30	(98.9)	98.8	99.0	99.5	99.0
31	99.1	99.9	99.5	99.5	99.1
32	99.9	99.4	99.6	99.4	99.1
33	98.5	98.7	98.5	99.4	99.3
34	97.5	100.0	98.8	99.5	99.1

TABLE AII.337 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
35	97.5	99.5	98.6	99.4	99.0
36	96.8	98.5	98.5	99.7	99.2
37	98.3	99.4	98.5	99.5	99.5
38	99.5	99.3	98.5	99.4	99.2
39	99.0	100.1	99.1	----	----
40	100.3	(99.5)	----	99.5	99.2
41	99.5	99.4	----	----	99.2
42	98.0	99.2	99.5	99.4	99.3
43	100.0	99.7	98.5	99.5	99.3
44	97.7	100.0	98.9	99.4	99.0
93	99.4	----	----	----	----
94	98.3	99.4	98.9	99.2	99.2
95	98.5	99.3	99.0	99.5	99.1
102	----	----	----	----	99.1

TABLE AII.338

INITIAL RECTAL TEMPERATURE: FLIGHT 3
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	98.0	99.9	99.5	99.5	99.2
46	99.1	100.1	99.3	99.2	99.8
47	99.5	99.8	99.5	99.5	99.8
48	99.3	100.3	99.7	99.7	99.3
49	98.5	99.4	99.7	99.5	99.3
50	98.0	99.7	99.0	99.5	99.0
51	99.0	99.5	99.0	100.0	99.5
52	99.2	99.3	98.5	99.0	99.2
53	98.5	99.0	99.0	99.0	99.2
54	98.5	99.4	98.7	100.0	99.5
55	99.2	99.4	99.0	99.0	99.0
56	99.5	99.3	98.5	99.0	99.1
57	99.4	99.4	98.5	98.7	99.1
58	99.9	(99.5)	----	99.0	99.1
59	(98.9)	(99.5)	99.8	99.4	99.4
60	98.5	99.0	98.7	98.9	99.3
61	99.5	99.5	98.5	99.5	99.0
62	98.5	99.7	99.4	99.5	99.2
63	98.3	98.7	98.5	99.2	99.0
64	99.5	99.5	100.0	99.7	99.4
65	98.5	99.7	98.5	98.9	99.0
66	99.5	99.5	98.5	99.0	99.0
96	99.3	100.1	99.4	99.0	98.9
97	99.0	100.0	99.5	99.2	99.5
98	99.0	99.7	99.2	98.9	99.0

TABLE AII.339

INITIAL RECTAL TEMPERATURE: FLIGHT 4
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	99.5	99.5	98.5	99.2	99.1
68	98.0	100.0	98.5	99.2	----
69	99.0	99.2	98.5	99.4	99.5
70	99.0	99.5	98.5	99.2	99.0
71	99.2	99.0	98.5	99.4	99.0
72	98.3	100.0	98.5	99.8	99.1
73	99.5	99.5	98.5	----	----
74	99.2	99.9	98.5	99.8	99.1
75	99.0	99.5	98.5	100.1	99.0
76	100.0	99.0	98.3	99.7	99.2
77	100.0	99.3	----	----	----
78	98.5	100.1	98.5	99.5	99.0
79	100.0	99.5	98.5	99.7	99.5
80	99.0	99.5	98.5	100.4	99.5
81	100.0	99.8	98.5	99.5	99.0
82	(99.2)	98.5	99.0	----	99.1
83	99.5	98.9	99.3	99.2	99.2
84	98.7	99.0	98.6	99.0	99.2
85	99.5	99.7	98.5	99.3	99.0
86	99.8	100.2	99.7	99.2	99.0
87	98.9	99.7	----	----	99.2
88	98.9	99.1	----	----	----
99	99.0	98.9	98.5	99.3	99.0
100	99.5	99.8	98.5	99.0	99.1
101	99.7	100.0	98.5	99.7	99.6

TABLE AII.340

FINAL RECTAL TEMPERATURE: FLIGHT 1
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	101.2	101.0	101.5	100.8	100.7
2	102.0	101.2	----	----	100.0
3	100.8	100.9	100.7	100.5	100.6
4	101.8	102.4	102.0	100.7	100.9
5	101.3	101.7	100.7	----	100.6
6	101.2	101.4	100.7	100.6	100.9
7	102.1	100.7	100.8	100.5	100.8
8	101.5	100.2	100.5	100.5	100.8
9	101.6	101.0	100.5	100.5	100.8
10	101.3	100.9	100.4	100.4	100.8
11	100.8	101.8	100.7	100.5	100.7
12	101.1	101.5	100.5	100.6	100.9

TABLE AII.340 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
13	101.0	101.7	100.3	-----	-----
14	101.8	101.8	100.4	100.6	100.6
15	102.3	101.3	100.4	-----	-----
16	100.5	101.0	100.4	-----	-----
17	101.5	(101.3)	100.5	100.5	100.5
18	101.2	101.4	100.5	101.3	100.6
19	101.0	101.3	100.4	100.3	-----
20	101.5	101.4	100.5	-----	-----
21	100.5	101.1	100.5	100.5	100.7
22	101.9	101.7	101.0	100.6	100.8
90	100.9	101.4	100.4	100.5	100.4
91	101.9	101.3	100.8	100.5	100.5
92	101.0	101.0	100.5	100.5	100.6

TABLE AII.341

FINAL RECTAL TEMPERATURE: FLIGHT 2
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	100.7	101.9	100.8	100.7	100.6
24	101.4	101.8	100.5	-----	-----
25	101.0	101.3	100.5	100.8	100.6
26	101.5	101.5	100.6	101.1	101.1
27	100.4	-----	100.1	100.7	100.7
28	101.0	101.4	100.4	100.6	100.6
29	101.5	101.8	100.3	100.6	100.5
30	(101.1)	101.4	100.7	100.7	100.7
31	101.0	101.0	101.5	100.5	100.5
32	101.4	101.3	100.9	100.5	100.5
33	101.2	101.5	100.5	100.9	100.6
34	100.3	101.3	100.9	100.6	100.5
35	100.5	101.2	100.4	100.5	100.5
36	100.7	102.5	100.5	100.9	101.5
37	100.5	100.6	100.4	100.5	100.6
38	101.7	101.7	101.3	100.6	100.6
39	101.2	101.2	101.0	-----	-----
40	101.7	(101.4)	-----	100.5	101.3
41	101.8	101.3	-----	-----	100.7
42	102.0	100.6	100.7	100.6	100.7
43	102.0	101.5	101.2	100.5	100.6
44	100.5	101.3	100.8	100.5	100.6
93	100.9	-----	-----	-----	-----
94	101.1	101.0	100.5	100.5	100.6
95	100.7	100.5	99.8	100.6	100.8
102	-----	-----	-----	-----	100.6

TABLE AII.342

FINAL RECTAL TEMPERATURE: FLIGHT 3
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	101.9	101.7	101.5	100.4	100.7
46	101.5	101.6	100.5	100.5	100.6
47	102.0	101.5	100.7	101.1	100.9
48	101.9	101.5	100.5	100.7	100.2
49	100.5	102.4	100.5	100.5	100.4
50	101.4	101.2	101.0	100.6	100.1
51	100.9	100.9	100.5	100.8	101.4
52	100.7	101.0	100.5	100.5	100.4
53	100.5	100.8	100.5	100.4	100.4
54	100.5	100.7	100.8	100.5	100.5
55	101.1	102.4	101.0	101.5	100.3
56	100.9	101.3	99.0	100.5	100.0
57	101.3	101.0	100.0	101.0	100.0
58	101.5	(101.5)	-----	100.5	100.0
59	(101.3)	(101.5)	100.5	100.7	99.9
60	101.4	101.4	100.5	101.5	100.6
61	101.1	101.5	100.0	100.3	100.3
62	101.7	101.3	100.3	101.0	100.4
63	101.5	102.1	100.0	100.4	100.4
64	101.4	101.7	100.5	101.8	100.3
65	101.0	102.0	101.0	100.9	100.5
66	102.4	101.5	100.5	101.0	100.5
96	101.5	102.0	100.8	100.7	100.3
97	101.7	102.1	100.7	100.5	100.3
98	101.3	101.4	100.5	100.5	100.3

TABLE AII.343

FINAL RECTAL TEMPERATURE: FLIGHT 4
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	101.5	101.5	100.4	101.6	100.2
68	101.5	101.7	100.5	100.6	-----
69	102.0	101.4	99.7	100.7	100.2
70	101.7	101.3	100.0	100.5	100.0
71	101.4	101.3	100.5	100.5	100.0
72	101.1	102.0	100.5	100.9	100.1
73	101.5	101.7	100.7	-----	-----
74	102.0	101.8	100.3	100.8	100.1
75	100.7	101.7	101.5	101.0	100.1
76	101.4	101.3	100.4	100.5	100.1
77	101.7	101.5	-----	-----	-----
78	102.0	102.0	101.1	101.2	100.0

TABLE AII.343 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
79	101.5	101.4	100.4	100.5	100.1
80	101.5	101.3	100.3	100.9	100.5
81	101.3	101.5	100.5	100.8	100.4
82	(101.4)	101.2	100.0	-----	100.1
83	101.4	101.4	100.4	100.5	100.2
84	101.3	101.3	100.5	101.0	100.2
85	101.0	101.0	101.4	100.7	100.0
86	101.4	101.1	100.5	100.5	100.0
87	100.7	101.9	-----	-----	100.3
88	101.5	101.4	-----	-----	-----
99	101.0	101.4	100.3	100.5	100.3
100	101.0	101.1	100.4	100.5	100.5
101	100.8	101.7	100.2	100.5	100.0

TABLE AII.344

EXERCISE INCREMENT OF RECTAL TEMPERATURE: FLIGHT 1
(°F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	2.9	2.5	2.0	1.3	1.2
2	4.0	1.2	---	---	0.5
3	2.8	1.2	1.5	0.9	1.1
4	2.5	2.7	2.0	0.9	1.2
5	2.3	1.5	1.2	---	1.2
6	3.0	1.7	1.7	1.1	1.7
7	1.8	1.2	1.3	1.0	1.5
8	2.0	0.7	1.0	1.0	1.8
9	2.7	1.5	1.0	1.0	1.5
10	2.0	1.4	1.4	1.1	1.1
11	2.6	2.1	1.9	0.7	1.6
12	1.8	2.0	1.4	0.7	1.5
13	2.5	2.3	1.5	---	---
14	2.5	2.1	1.8	1.1	1.6
15	2.4	2.7	1.4	---	---
16	2.9	1.9	1.1	---	---
17	3.0	(1.7)	1.5	1.3	1.1
18	3.2	1.7	1.0	1.8	1.2
19	1.7	1.6	0.6	1.6	---
20	3.0	1.7	1.5	---	---
21	1.6	1.4	1.7	0.8	1.5
22	2.2	1.7	1.1	1.1	1.8
90	2.4	1.6	1.0	1.1	1.1
91	2.9	1.4	1.0	1.0	1.4
92	2.0	1.3	0.8	1.0	1.1

TABLE AII.345

EXERCISE INCREMENT OF RECTAL TEMPERATURE: FLIGHT 2
(°F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	2.8	2.4	1.7	1.4	1.8
24	1.3	2.1	1.4	---	---
25	1.3	1.8	1.8	1.3	1.6
26	2.4	1.8	2.1	1.6	2.1
27	2.4	---	1.1	2.0	1.6
28	1.8	1.7	1.7	0.9	1.6
29	1.2	1.9	1.3	1.1	1.5
30	(2.2)	2.6	1.7	1.2	1.7
31	1.9	1.1	2.0	1.0	1.4
32	1.5	1.9	1.3	1.1	1.4
33	2.7	2.8	2.0	1.5	1.3
34	2.8	1.3	2.1	1.1	1.4
35	3.0	1.7	1.8	1.1	1.5
36	3.9	4.0	2.0	1.2	2.3
37	2.2	1.2	1.9	1.0	1.1
38	2.2	2.1	2.8	1.2	1.4
39	2.2	1.1	1.9	---	---
40	1.4	(1.8)	---	1.0	2.1
41	2.3	1.9	---	---	1.5
42	4.0	1.4	2.2	1.2	1.4
43	2.0	1.8	2.7	1.0	1.3
44	2.8	1.3	1.9	1.1	1.6
93	1.5	---	---	---	---
94	2.8	1.6	1.6	1.3	1.4
95	2.2	1.2	0.8	1.1	1.7
102	---	---	---	---	1.5

TABLE AII.346

EXERCISE INCREMENT OF RECTAL TEMPERATURE: FLIGHT 3
(°F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	3.9	1.8	2.0	0.9	1.5
46	2.4	0.5	1.2	1.3	0.8
47	2.5	1.7	1.2	1.6	1.1
48	2.6	1.2	0.8	1.0	0.9
49	2.0	3.0	0.8	1.0	1.1
50	3.4	1.5	2.0	1.1	1.1
51	1.9	1.4	1.5	0.8	0.9
52	1.5	1.7	2.0	1.5	1.2
53	2.0	1.8	1.5	1.4	1.2
54	2.0	1.3	2.1	0.5	1.5
55	1.9	3.0	2.0	2.5	1.3
56	1.4	2.0	0.5	1.5	0.9

TABLE AII.346 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
57	1.9	1.6	1.5	2.3	0.9
58	1.6	(1.9)	---	1.5	0.9
59	(2.3)	(1.9)	0.7	1.3	0.5
60	2.9	2.4	1.8	2.6	1.3
61	1.6	2.0	1.5	0.8	1.3
62	3.2	1.6	0.9	1.5	1.2
63	3.2	3.4	1.5	1.2	1.4
64	1.9	2.2	0.5	2.1	0.9
65	2.5	2.3	2.5	2.0	1.5
66	2.9	2.0	2.0	2.0	1.5
96	2.2	1.9	1.4	1.7	1.4
97	2.7	2.1	1.2	1.3	0.8
98	2.3	1.7	1.3	1.6	1.3

TABLE AII.347

EXERCISE INCREMENT OF RECTAL TEMPERATURE: FLIGHT 4
(°F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	2.0	2.0	1.9	1.4	1.1
68	3.5	1.7	2.0	1.4	---
69	3.0	2.2	1.9	1.3	0.7
70	2.4	1.8	1.5	1.3	1.0
71	2.2	2.3	2.0	1.1	1.0
72	2.8	2.0	2.0	1.1	1.0
73	2.0	2.2	1.9	---	---
74	2.8	1.9	1.8	1.0	1.0
75	1.7	1.9	3.0	0.9	1.1
76	1.4	2.3	2.1	0.8	0.9
77	1.7	2.2	---	---	---
78	3.5	1.9	2.6	1.7	1.0
79	1.5	1.9	1.9	0.8	0.6
80	2.5	1.8	1.8	0.5	1.0
81	1.3	1.7	2.0	1.3	1.4
82	(2.2)	2.7	1.0	---	1.0
83	1.9	2.5	1.1	1.3	1.0
84	2.6	2.3	1.9	1.0	1.0
85	1.5	1.3	1.9	1.4	1.0
86	1.6	0.9	0.8	1.3	1.0
87	1.8	2.2	---	---	1.1
88	2.6	2.3	---	---	---
99	2.0	2.5	1.8	1.2	1.3
100	1.5	1.3	1.9	1.5	1.4
101	1.1	1.7	1.7	0.8	0.4

TABLE AII.348

INITIAL PULSE RATE: FLIGHT 1
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	80	84	54	76	78
2	68	76	--	--	76
3	70	80	64	64	92
4	96	90	70	98	108
5	84	84	96	--	92
6	100	90	88	86	96
7	72	76	84	88	80
8	76	76	90	84	80
9	78	94	84	100	84
10	84	80	60	80	80
11	90	90	72	80	82
12	72	102	62	84	76
13	76	76	54	--	--
14	90	92	72	94	72
15	112	80	64	--	--
16	88	80	104	--	--
17	70	(85)	60	68	80
18	104	88	66	112	100
19	70	82	68	72	--
20	80	86	62	--	--
21	94	100	72	98	84
22	82	84	92	78	80
90	84	92	82	84	72
91	74	76	76	80	82
92	82	88	88	82	90

TABLE AII.349

INITIAL PULSE RATE: FLIGHT 2
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	66	74	60	70	82
24	84	86	66	--	--
25	82	96	74	110	104
26	72	74	56	64	80
27	85	--	60	60	98
28	80	104	62	96	100
29	70	68	68	72	84
30	(76)	78	62	70	80
31	66	64	68	82	104
32	84	68	84	84	76
33	58	76	64	66	70
34	80	80	72	86	98

TABLE AII.349 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
35	82	96	60	84	84
36	72	102	70	84	104
37	88	82	84	84	84
38	78	74	56	88	80
39	76	72	68	--	--
40	58	(81)	--	84	82
41	80	56	--	--	88
42	78	88	62	76	76
43	84	92	70	84	84
44	78	84	70	76	74
93	64	--	--	--	--
94	82	94	82	84	84
95	60	78	66	82	72
102	--	--	--	--	82

TABLE AII.350

INITIAL PULSE RATE: FLIGHT 3
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	68	74	46	90	82
46	72	66	54	84	90
47	96	90	64	106	112
48	80	88	52	84	84
49	80	72	64	84	80
50	90	100	64	104	88
51	66	88	60	88	96
52	98	80	78	76	104
53	72	84	56	100	92
54	80	100	84	84	96
55	92	80	114	104	82
56	72	70	76	100	96
57	72	80	68	92	72
58	74	(84)	--	84	78
59	(82)	(84)	64	98	76
60	88	80	80	102	78
61	68	76	58	84	82
62	82	90	68	86	78
63	86	90	84	90	82
64	88	86	64	88	96
65	112	104	98	122	112
66	78	80	64	84	76
96	80	82	68	92	72
97	88	86	74	88	68
98	88	86	86	94	82

TABLE AII.351

INITIAL PULSE RATE: FLIGHT 4
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	80	84	56	76	80
68	74	68	60	84	--
69	62	73	50	80	88
70	74	83	60	100	98
71	68	72	54	70	84
72	74	76	72	92	84
73	80	84	98	--	--
74	102	72	72	86	100
75	88	84	72	98	84
76	92	82	68	104	108
77	82	70	--	--	--
78	80	78	84	104	96
79	80	80	68	94	84
80	82	78	86	84	74
81	82	70	56	82	82
82	(80)	80	74	--	96
83	82	88	72	86	84
84	78	86	76	102	100
85	84	98	76	76	98
86	94	64	72	68	76
87	80	76	--	--	76
88	60	64	--	--	--
99	80	74	82	88	70
100	70	84	74	84	66
101	84	92	104	92	72

TABLE AII.352

FINAL PULSE RATE: FLIGHT 1
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	124	122	156	122	118
2	120	110	---	---	96
3	112	123	116	100	108
4	116	148	144	124	124
5	119	112	110	---	128
6	138	130	128	130	126
7	96	104	108	88	102
8	94	96	114	140	138
9	124	114	120	128	122
10	102	102	104	128	104
11	106	124	100	108	120
12	102	124	124	108	102

TABLE AII.352 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
13	96	102	102	---	---
14	104	112	122	110	112
15	110	124	106	---	---
16	110	96	80	---	---
17	104	(116)	132	118	132
18	114	150	154	124	142
19	112	114	120	100	---
20	104	112	110	---	---
21	126	124	112	132	122
22	140	102	154	124	122
90	86	98	92	92	76
91	104	96	108	104	112
92	88	110	110	118	100

TABLE AII.353

FINAL PULSE RATE: FLIGHT 2
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	94	104	112	152	110
24	104	108	140	---	---
25	106	136	148	170	122
26	112	112	160	168	152
27	90	---	104	120	108
28	138	120	120	118	124
29	78	98	136	100	106
30	(97)	94	98	110	120
31	72	102	180	112	122
32	104	110	130	124	132
33	68	90	148	96	92
34	106	114	168	104	112
35	96	108	156	122	94
36	86	120	134	144	114
37	104	138	116	118	108
38	92	106	128	108	104
39	94	80	98	---	---
40	84	(107)	---	72	80
41	104	108	---	---	108
42	96	98	86	108	88
43	110	98	88	96	100
44	104	100	100	94	110
93	106	---	---	---	---
94	88	110	108	104	110
95	122	124	100	106	96
102	---	---	---	---	112

TABLE AII.354

FINAL PULSE RATE: FLIGHT 3
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	112	134	120	120	118
46	94	100	134	96	114
47	142	164	127	144	130
48	120	126	130	102	134
49	110	102	130	104	98
50	108	124	122	140	124
51	96	108	100	120	108
52	106	120	114	124	120
53	110	124	144	120	122
54	120	134	140	124	136
55	120	138	136	126	116
56	106	132	108	148	124
57	112	130	118	120	124
58	112	(124)	---	138	118
59	(110)	(124)	116	144	112
60	104	118	110	112	118
61	96	114	74	120	110
62	106	112	148	132	116
63	126	120	104	98	124
64	96	124	88	128	112
65	122	154	140	152	156
66	96	100	98	110	104
96	102	122	102	90	96
97	130	164	132	140	148
98	110	132	148	142	120

TABLE AII.355

FINAL PULSE RATE: FLIGHT 4
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	106	96	106	100	114
68	124	114	122	122	---
69	102	90	84	108	144
70	98	128	148	134	122
71	108	100	112	124	110
72	116	95	110	112	104
73	106	98	126	---	---
74	140	146	126	124	146
75	102	114	116	112	114
76	110	120	154	118	146
77	114	116	---	---	---
78	102	82	128	90	120

TABLE AII.355 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
79	92	104	108	116	112
80	104	118	102	106	122
81	80	108	106	112	118
82	(106)	110	112	---	132
83	100	86	92	84	116
84	114	114	126	110	126
85	114	126	100	112	118
86	118	116	114	90	116
87	104	126	---	---	132
88	72	100	---	---	---
99	88	98	90	96	90
100	92	124	90	92	72
101	114	---	162	128	144

TABLE AII.356

EXERCISE INCREMENT OF PULSE RATE: FLIGHT 1

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	44	38	102	46	40
2	52	34	--	--	20
3	42	43	52	36	16
4	20	58	74	26	16
5	35	38	14	--	36
6	38	40	40	44	30
7	34	28	24	0	40
8	18	20	24	56	58
9	46	20	36	28	38
10	18	22	44	48	24
11	16	34	28	28	38
12	30	22	62	24	26
13	20	26	48	--	--
14	14	20	50	16	40
15	-2	44	42	--	--
16	22	16	-24	--	--
17	34	(32)	72	50	52
18	10	62	68	12	42
19	52	32	52	28	--
20	24	26	48	--	--
21	32	24	50	34	38
22	58	18	62	46	42
90	2	6	10	8	4
91	30	20	32	24	30
92	6	22	22	36	10

TABLE AII.357

EXERCISE INCREMENT OF PULSE RATE: FLIGHT 2
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	28	30	52	82	28
24	20	22	74	--	--
25	24	40	74	60	18
26	40	38	104	104	72
27	5	--	44	60	10
28	58	16	58	22	24
29	8	30	68	28	22
30	(21)	16	36	40	40
31	6	38	112	30	18
32	20	42	46	40	56
33	10	14	84	30	22
34	26	34	96	18	14
35	14	12	96	38	10
36	14	18	64	60	10
37	16	56	32	34	24
38	14	32	72	20	24
39	18	8	30	--	--
40	26	(27)	--	-12	-2
41	24	52	--	--	20
42	18	10	24	32	12
43	26	6	18	12	16
44	26	16	30	18	36
93	42	--	--	--	--
94	6	16	26	20	26
95	62	46	34	24	24
102	--	--	--	--	30

TABLE AII.358

EXERCISE INCREMENT OF PULSE RATE: FLIGHT 3
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	44	60	74	30	36
46	22	34	80	12	24
47	46	74	60	38	18
48	40	38	78	18	50
49	30	30	66	20	18
50	18	24	78	36	36
51	30	20	40	32	12
52	8	40	36	48	16
53	38	40	88	20	30
54	40	34	56	40	40
55	28	58	22	22	34
56	34	62	32	48	28

TABLE AII.358 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
57	50	50	50	28	52
58	38	(40)	--	54	40
59	(29)	(40)	52	46	36
60	16	38	30	10	40
61	28	38	16	36	28
62	24	22	80	46	38
63	40	30	20	8	42
64	8	38	24	40	16
65	10	50	42	30	44
66	18	20	34	26	28
96	22	40	34	-2	24
97	42	78	58	52	80
98	22	46	62	48	38

TABLE AII.359

EXERCISE INCREMENT OF PULSE RATE: FLIGHT 4
(Beats/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	26	12	50	24	30
68	50	46	62	38	--
69	40	17	34	28	56
70	24	45	80	34	24
71	40	28	58	54	26
72	52	19	38	20	20
73	26	14	28	--	--
74	38	74	24	38	46
75	14	30	44	24	30
76	18	48	86	14	38
77	32	46	--	--	--
78	22	4	44	-14	24
79	12	24	40	22	28
80	22	40	16	22	48
81	-2	38	50	40	36
82	(27)	30	38	--	36
83	18	-2	20	-2	32
84	36	28	50	8	26
85	30	28	24	36	20
86	24	52	42	22	40
87	24	50	--	--	56
88	12	36	--	--	--
99	8	24	8	8	20
100	22	40	16	8	6
101	30	--	58	36	72

TABLE AII.360

INITIAL SKIN TEMPERATURE UNDER GLOVE: FLIGHT 1
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	91.5	94.2	94.8	92.3	92.6
2	90.3	93.2	----	----	93.6
3	94.5	97.2	93.7	95.1	96.3
4	94.0	95.8	94.6	94.5	93.1
5	91.6	96.7	98.2	----	95.2
6	92.3	94.5	94.8	95.0	95.7
7	91.3	95.6	94.6	96.0	93.5
8	93.5	94.5	95.0	93.9	93.4
9	93.0	95.9	93.4	95.0	94.8
10	92.2	96.3	95.7	95.9	95.7
11	90.3	94.3	94.0	93.8	93.4
12	92.8	96.4	95.0	94.6	94.7
13	92.8	95.2	92.8	----	----
14	92.1	94.6	92.4	92.8	96.3
15	94.5	95.2	94.6	----	----
16	91.7	95.0	95.2	----	----
17	93.4	(95.5)	92.3	94.1	93.8
18	91.7	96.1	95.0	96.5	94.6
19	91.6	95.8	96.2	95.0	95.2
20	92.0	97.1	96.4	----	----
21	91.8	95.2	95.5	95.5	95.6
22	93.6	96.1	95.0	94.6	95.2
90	94.2	95.7	95.0	95.0	95.2
91	94.3	96.5	95.5	96.1	95.8
92	93.8	96.3	95.5	94.5	94.6

TABLE AII.361

INITIAL SKIN TEMPERATURE UNDER GLOVE: FLIGHT 2
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	92.9	93.2	94.2	92.4	94.4
24	93.9	95.8	95.8	----	----
25	94.2	95.0	93.6	94.6	94.9
26	95.0	94.8	96.0	94.2	95.4
27	93.8	----	95.5	93.6	94.8
28	91.8	95.2	95.0	94.2	96.2
29	93.4	94.8	96.2	94.8	95.9
30	(93.4)	96.2	95.7	94.5	93.5
31	91.7	94.3	98.2	94.2	95.7
32	94.2	95.4	96.3	95.3	94.4
33	94.0	94.9	96.3	95.1	96.0
34	92.5	94.7	95.0	93.7	95.0

TABLE AII.361 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
35	94.2	95.4	95.9	95.6	95.7
36	92.9	96.2	94.5	94.1	97.0
37	94.2	96.8	95.1	94.2	96.7
38	95.3	95.4	95.6	95.9	96.0
39	92.7	95.0	95.9	----	----
40	92.5	(95.3)	----	94.3	95.8
41	92.4	96.5	----	----	95.4
42	93.1	95.9	96.3	94.4	96.6
43	92.7	95.7	96.2	95.1	94.5
44	93.4	94.8	95.9	95.4	94.9
93	93.8	----	----	----	----
94	93.2	95.8	95.1	94.2	96.4
95	93.0	96.3	95.7	94.1	96.2
102	----	----	----	----	96.2

TABLE AII.362

INITIAL SKIN TEMPERATURE UNDER GLOVE: FLIGHT 3
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	93.0	94.0	91.7	93.5	92.8
46	91.9	93.0	92.5	92.3	93.3
47	94.1	94.4	93.2	94.0	94.6
48	92.8	95.5	92.2	94.7	94.7
49	91.3	95.9	93.3	94.3	94.3
50	93.8	94.8	94.2	95.7	94.1
51	92.0	93.1	91.6	92.6	94.1
52	91.4	95.0	92.8	92.8	95.2
53	93.6	95.2	93.3	95.0	95.2
54	91.8	95.2	91.3	92.7	94.2
55	92.8	95.0	94.2	95.3	93.9
56	92.7	95.4	93.2	93.2	94.0
57	93.3	95.6	93.4	94.7	94.9
58	93.4	(94.9)	----	95.3	94.1
59	(92.8)	(94.9)	92.0	94.7	94.3
60	92.6	92.4	90.9	92.3	93.0
61	92.2	96.4	92.6	94.3	93.5
62	91.1	96.4	92.4	94.3	94.4
63	93.3	95.3	93.0	94.4	94.6
64	94.0	95.5	92.9	96.2	95.3
65	94.0	94.7	94.7	93.9	93.6
66	94.0	95.3	93.2	94.7	95.5
96	93.6	96.4	94.0	95.9	94.9
97	94.9	95.4	95.3	94.7	94.0
98	96.5	95.8	96.3	96.3	94.3

TABLE AII.363

INITIAL SKIN TEMPERATURE UNDER GLOVE: FLIGHT 4
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	95.2	96.1	93.3	95.4	96.2
68	92.1	95.7	92.8	94.6	----
69	94.3	94.5	91.8	96.2	95.2
70	94.7	97.2	93.4	96.3	95.7
71	93.2	95.3	94.2	94.1	94.2
72	92.3	95.4	94.5	95.6	94.7
73	92.4	95.5	95.1	----	----
74	94.2	94.9	92.2	94.5	94.0
75	92.0	94.2	91.7	95.0	92.8
76	94.2	95.2	95.1	94.6	94.6
77	92.5	94.8	----	----	----
78	91.4	96.4	93.5	94.8	94.6
79	93.4	95.2	92.0	96.5	95.6
80	94.3	94.4	92.8	95.6	94.7
81	93.0	95.8	93.0	94.6	94.2
82	(93.2)	95.8	92.4	----	94.9
83	92.0	94.8	93.6	95.8	94.0
84	93.7	96.2	93.1	94.8	93.6
85	92.4	95.4	92.8	94.2	95.7
86	94.6	96.7	94.7	95.9	96.2
87	92.4	95.1	----	----	94.0
88	93.9	95.6	----	----	----
99	95.8	96.7	95.8	95.8	95.5
100	93.4	94.5	93.7	94.2	93.9
101	95.0	96.4	95.0	96.0	95.2

TABLE AII.364

FINAL SKIN TEMPERATURE UNDER GLOVE: FLIGHT 1
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	93.9	99.0	98.4	96.4	96.8
2	96.3	99.0	----	----	97.7
3	95.3	98.8	97.8	97.9	97.3
4	95.2	99.5	99.3	97.5	97.2
5	95.1	99.2	98.2	----	97.8
6	92.9	99.2	98.4	95.7	96.2
7	95.0	99.1	98.5	97.3	97.3
8	95.7	98.2	98.2	96.5	97.0
9	96.3	98.9	98.2	97.0	97.0
10	95.5	98.9	98.1	96.8	96.5
11	94.9	98.3	98.2	97.1	97.8
12	94.8	99.1	98.2	96.9	97.8

TABLE AII.364 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
13	95.0	98.8	98.6	----	----
14	95.1	98.9	97.9	97.4	98.1
15	95.7	98.6	98.0	----	----
16	94.6	98.3	97.8	----	----
17	96.4	(98.9)	98.2	97.2	97.2
18	95.8	99.2	98.1	97.3	97.7
19	93.7	99.0	98.7	97.0	----
20	94.0	97.8	98.5	----	----
21	96.3	100.0	99.1	97.4	96.8
22	95.0	98.9	98.9	95.8	96.2
90	95.6	99.0	98.5	96.8	96.3
91	97.3	98.8	98.9	97.3	97.8
92	95.8	98.2	98.5	96.1	96.2

TABLE AII.365

FINAL SKIN TEMPERATURE UNDER GLOVE: FLIGHT 2
(^{o}F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	96.0	99.6	98.9	98.0	96.1
24	94.0	98.8	98.2	----	----
25	94.5	98.8	98.0	97.6	95.2
26	96.6	98.9	98.8	98.2	97.3
27	95.0	----	97.7	97.8	95.1
28	95.5	99.0	98.3	97.8	96.5
29	96.0	98.4	97.9	97.7	96.7
30	(95.3)	98.4	98.2	95.7	96.2
31	95.3	98.7	100.9	97.8	97.0
32	95.8	98.7	98.9	97.4	96.0
33	96.4	99.2	100.1	97.8	96.2
34	94.2	98.8	99.8	96.5	95.6
35	95.8	98.7	99.2	96.8	97.3
36	96.7	99.3	99.1	98.1	97.1
37	96.7	99.4	99.2	96.4	97.1
38	97.8	99.0	99.1	97.4	97.2
39	93.7	98.4	99.1	----	----
40	94.6	(98.8)	----	97.2	96.7
41	93.1	96.5	----	----	96.7
42	95.4	98.5	98.5	97.0	96.8
43	94.1	98.4	99.2	96.0	95.4
44	94.5	98.5	98.9	95.6	95.1
93	94.9	----	----	----	----
94	94.1	99.0	98.4	95.5	98.0
95	95.0	98.7	97.5	95.0	97.1
102	----	----	----	----	97.1

TABLE AII.366

FINAL SKIN TEMPERATURE UNDER GLOVE: FLIGHT 3
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	96.5	99.2	97.6	97.9	97.4
46	99.0	99.2	97.4	97.9	97.3
47	97.2	98.9	97.4	98.2	97.7
48	97.8	99.1	98.0	98.7	97.5
49	96.1	98.8	97.0	97.8	96.7
50	96.7	99.2	96.9	98.7	97.1
51	97.1	98.9	96.8	98.3	97.2
52	95.8	98.7	96.8	97.8	97.2
53	97.0	99.0	97.0	98.1	97.6
54	95.3	98.9	97.0	98.2	97.4
55	97.0	99.9	98.9	98.4	98.4
56	96.4	99.8	96.6	98.4	97.9
57	95.8	99.2	96.8	98.1	97.8
58	97.1	(99.2)	----	99.0	97.0
59	(96.5)	(99.2)	97.0	99.5	97.7
60	95.6	99.2	92.5	98.6	97.7
61	95.4	99.2	97.2	98.2	96.6
62	95.8	99.2	96.8	98.6	97.2
63	96.4	99.0	97.5	98.2	97.6
64	96.7	99.2	97.9	98.4	97.1
65	95.2	99.2	98.1	97.5	96.6
66	97.3	99.3	97.1	97.1	98.0
96	95.0	98.8	97.2	97.5	97.1
97	97.6	100.7	98.3	98.6	98.2
98	97.7	99.3	98.2	97.8	97.9

TABLE AII.367

FINAL SKIN TEMPERATURE UNDER GLOVE: FLIGHT 4
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	95.5	99.7	98.4	97.8	97.2
68	95.3	100.0	98.6	97.9	----
69	95.1	99.4	97.9	98.4	98.2
70	96.9	99.3	97.9	97.8	97.6
71	95.6	99.0	98.0	97.0	97.4
72	96.5	99.6	98.7	98.0	97.9
73	95.8	99.2	98.2	----	----
74	97.0	100.0	97.7	97.7	98.1
75	96.2	99.4	98.0	97.8	97.7
76	96.8	99.2	98.2	97.4	97.9
77	94.5	99.2	----	----	----
78	96.4	99.1	98.2	97.7	98.2

TABLE AII.367 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
79	96.3	99.0	98.2	97.5	97.8
80	96.0	98.8	96.9	96.3	98.4
81	95.3	99.1	97.9	98.2	98.0
82	(96.0)	99.3	97.6	----	98.5
83	94.3	98.8	97.1	96.1	97.8
84	96.1	99.0	98.8	97.2	97.5
85	96.2	96.6	97.6	96.4	97.3
86	97.2	99.0	98.5	97.3	98.3
87	96.4	99.6	----	----	98.7
88	95.8	99.2	----	----	----
99	96.3	99.4	98.8	96.7	98.3
100	94.8	98.9	98.0	96.5	97.8
101	97.2	99.8	99.0	98.2	98.5

TABLE AII.368

EXERCISE INCREMENT OF SKIN TEMPERATURE
UNDER GLOVE: FLIGHT 1
($^{o}F/hr$)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	2.4	4.8	3.6	4.1	4.2
2	6.0	5.8	---	---	4.1
3	0.8	1.6	4.1	2.8	1.0
4	1.2	3.7	4.7	3.0	4.1
5	3.5	2.5	0.0	---	2.6
6	0.6	4.7	3.6	0.7	0.5
7	3.7	3.5	3.9	1.3	3.8
8	2.2	3.7	3.2	2.6	3.6
9	3.3	3.2	4.8	2.0	2.2
10	3.3	2.6	2.4	0.9	0.8
11	4.6	4.0	4.2	3.3	4.4
12	2.0	2.6	3.2	2.3	3.1
13	2.2	3.6	5.8	---	---
14	3.0	4.3	5.5	4.6	1.8
15	1.2	3.4	3.4	---	---
16	2.9	3.3	2.6	---	---
17	3.0	(3.4)	5.9	3.1	3.4
18	4.1	3.1	3.1	1.8	3.1
19	2.1	3.2	2.5	1.6	---
20	2.0	0.7	2.1	---	---
21	4.5	4.8	3.6	1.9	1.2
22	1.4	2.8	3.9	1.2	1.0
90	1.4	3.3	4.5	1.8	1.1
91	3.0	2.3	3.9	1.2	2.0
92	2.0	1.9	3.0	1.6	1.6

TABLE AII.369

EXERCISE INCREMENT OF SKIN TEMPERATURE
UNDER GLOVE: FLIGHT 2
($^{\circ}$F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	3.1	6.4	4.7	5.6	1.7
24	0.1	3.0	2.4	---	---
25	0.3	3.8	4.4	3.0	0.3
26	1.6	4.1	2.8	4.0	1.9
27	1.2	---	2.2	4.2	0.3
28	3.7	3.8	3.3	3.6	0.3
29	2.6	3.6	1.7	2.9	0.6
30	(1.9)	2.2	2.5	1.2	2.7
31	3.6	4.4	2.7	3.6	1.3
32	1.6	3.3	2.6	2.1	1.6
33	2.4	4.3	3.8	2.7	0.2
34	1.7	4.1	4.8	2.8	0.6
35	1.6	3.3	3.3	1.2	1.6
36	3.8	3.1	4.6	4.0	0.1
37	2.5	2.6	4.1	2.2	0.4
38	2.5	3.6	3.5	1.5	1.2
39	1.0	3.4	3.2	---	---
40	2.1	(3.5)	---	2.9	0.9
41	0.7	2.0	---	---	1.3
42	2.3	2.6	2.2	2.6	0.2
43	1.5	2.7	3.0	0.9	0.9
44	1.1	3.7	3.0	0.2	0.2
93	1.1	---	---	---	---
94	0.9	3.2	3.3	1.3	1.6
95	2.0	2.4	1.8	0.9	0.9
102	---	---	---	---	0.9

TABLE AII.370

EXERCISE INCREMENT OF SKIN TEMPERATURE
UNDER GLOVE: FLIGHT 3
($^{\circ}$F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	3.5	5.2	5.9	4.4	4.6
46	7.1	6.2	4.9	5.6	4.0
47	3.1	4.5	4.2	4.2	3.1
48	5.0	3.6	5.8	4.0	2.8
49	4.8	2.9	3.7	3.5	2.4
50	2.9	4.4	2.7	3.0	3.0
51	5.1	5.8	5.2	5.7	3.1
52	4.4	3.7	4.0	5.0	2.0
53	3.4	3.8	3.7	3.1	2.4
54	3.5	3.7	5.7	5.5	3.2

TABLE AII.370 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
55	4.2	4.9	4.7	3.1	4.5
56	3.7	4.4	3.4	5.2	3.9
57	2.5	3.6	3.4	3.5	2.9
58	3.7	(4.2)	---	3.7	2.9
59	(3.7)	(4.2)	5.0	4.8	3.4
60	3.0	6.8	1.6	6.3	4.7
61	3.2	2.8	4.6	3.9	3.1
62	4.7	2.8	4.4	4.3	2.8
63	3.1	3.7	4.5	3.8	3.0
64	2.7	3.7	5.0	2.2	1.8
65	1.2	4.6	3.4	3.6	3.0
66	3.3	4.0	3.9	2.4	2.5
96	1.4	2.4	3.2	1.6	2.2
97	2.7	5.3	3.0	3.9	4.2
98	1.2	3.5	1.9	1.5	3.6

TABLE AII.371

EXERCISE INCREMENT OF SKIN TEMPERATURE
UNDER GLOVE: FLIGHT 4
(°F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	0.3	3.6	5.1	2.4	1.0
68	3.2	4.3	5.8	3.3	---
69	0.8	4.9	6.1	2.2	3.0
70	2.2	2.1	4.5	1.5	1.9
71	2.4	3.7	3.8	4.9	3.2
72	4.2	4.2	4.2	2.4	3.2
73	3.4	3.7	3.1	---	---
74	2.8	5.1	5.5	3.2	4.1
75	4.2	5.2	6.3	2.8	4.9
76	2.2	4.0	3.1	2.8	3.3
77	2.0	4.4	---	---	---
78	5.0	2.7	4.7	2.9	3.6
79	2.9	3.8	6.2	1.0	2.2
80	1.7	4.4	4.1	0.7	3.7
81	2.3	3.3	4.9	3.6	3.8
82	(2.7)	3.5	5.2	---	3.6
83	2.3	4.0	3.5	0.3	3.8
84	2.5	2.8	5.7	2.4	3.9
85	3.8	1.2	4.8	2.2	1.6
86	2.6	2.3	3.8	1.4	2.1
87	4.0	4.5	---	---	4.7
88	1.9	3.6	---	---	---
99	0.5	2.7	3.0	0.9	2.8
100	1.4	1.4	4.3	2.3	3.9
101	2.2	3.4	4.0	2.2	3.3

TABLE AII.372

INITIAL SKIN TEMPERATURE OUTSIDE GLOVE:
FLIGHT 1
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	----	92.0	95.0	90.0	88.9
2	----	92.7	----	----	91.3
3	----	95.4	94.5	92.4	91.3
4	----	95.3	96.2	91.9	91.3
5	----	96.6	95.9	----	92.0
6	----	94.0	95.9	93.0	89.8
7	----	94.3	96.3	93.8	92.0
8	----	95.0	95.8	92.4	89.8
9	----	94.6	94.8	90.3	90.7
10	----	96.2	94.9	93.5	93.0
11	----	93.1	95.0	91.0	90.5
12	----	94.4	95.4	< 90.0	89.8
13	----	93.2	95.8	----	----
14	----	95.4	93.8	< 90.0	91.7
15	----	93.9	94.4	----	----
16	----	94.9	95.0	----	----
17	----	(94.7)	91.0	91.0	90.3
18	----	94.4	95.9	93.0	92.4
19	----	95.6	94.6	91.9	----
20	----	96.7	94.8	----	----
21	----	94.8	93.8	92.3	92.5
22	----	95.5	95.4	90.0	93.7
90	----	95.9	94.5	92.5	93.8
91	----	94.4	94.1	93.2	92.9
92	----	95.0	94.5	93.4	91.5

TABLE AII.373

INITIAL SKIN TEMPERATURE OUTSIDE GLOVE:
FLIGHT 2
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	91.4	93.2	94.0	92.7	92.9
24	93.1	96.0	96.2	----	----
25	92.8	95.6	95.8	93.6	93.1
26	92.3	94.2	95.0	93.6	93.4
27	93.0	----	95.0	92.9	94.5
28	92.8	94.5	94.6	93.5	94.5
29	90.7	93.0	95.2	92.4	93.6
30	----	96.3	95.7	93.0	93.8
31	89.8	93.3	97.0	91.2	93.2
32	91.5	95.0	95.5	94.1	93.2
33	92.6	94.0	95.2	94.0	95.4
34	91.3	94.0	94.9	94.6	94.9

TABLE AII.373 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
35	93.2	94.5	95.4	94.9	95.2
36	91.3	94.2	94.1	93.2	94.1
37	94.8	96.2	94.5	94.2	95.3
38	93.2	94.0	93.9	93.7	93.2
39	92.6	95.0	95.3	----	----
40	93.4	(94.7)	----	92.2	93.9
41	92.8	96.1	----	----	95.2
42	94.3	95.8	95.3	95.0	95.6
43	93.8	95.2	94.9	93.7	94.0
44	92.2	94.0	94.9	92.7	94.6
93	91.8	----	----	----	----
94	92.0	94.5	93.5	93.3	93.9
95	91.8	95.0	94.5	93.4	95.5
102	----	----	----	----	95.2

TABLE AII.374

INITIAL SKIN TEMPERATURE OUTSIDE GLOVE:
FLIGHT 3
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	94.8	95.2	95.3	90.6	<90.0
46	93.2	95.0	95.3	91.3	91.3
47	92.3	94.3	94.5	92.6	94.4
48	93.8	96.0	95.2	92.0	92.9
49	93.4	92.0	94.3	93.0	93.2
50	92.0	94.9	92.5	93.6	93.1
51	93.2	93.9	92.0	91.4	92.3
52	93.2	93.6	94.3	92.0	92.9
53	93.0	93.8	92.8	92.7	93.7
54	92.6	93.2	93.8	92.0	92.0
55	94.7	96.0	93.0	94.1	93.9
56	93.2	93.8	92.8	93.8	92.0
57	94.0	95.2	93.0	93.5	93.0
58	93.5	(94.3)	----	93.0	93.7
59	----	(94.3)	92.6	92.9	92.8
60	93.2	91.6	91.6	93.7	93.6
61	93.7	96.0	92.9	93.4	93.8
62	94.4	93.5	91.9	92.2	90.4
63	94.5	94.0	93.0	93.0	93.0
64	94.2	95.6	93.8	91.7	94.1
65	93.5	93.8	95.0	93.6	92.6
66	93.4	94.0	93.1	92.3	93.5
96	94.3	95.6	94.2	94.0	93.5
97	93.3	93.4	93.1	92.6	91.4
98	95.7	94.3	93.2	91.9	92.5

TABLE AII.375

INITIAL SKIN TEMPERATURE OUTSIDE GLOVE:
FLIGHT 4
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	94.5	95.6	94.9	93.9	91.5
68	92.4	95.0	94.5	95.6	----
69	92.3	94.1	95.1	93.7	92.3
70	94.5	95.3	94.6	93.8	95.0
71	93.7	94.5	94.5	92.2	94.3
72	< 90.0	95.0	94.8	93.7	92.2
73	92.6	94.8	94.6	----	----
74	91.0	93.7	91.7	92.6	92.8
75	92.0	94.4	93.7	91.8	92.3
76	93.8	95.2	94.5	92.8	93.6
77	93.8	94.7	----	----	----
78	93.3	96.0	95.0	93.9	92.2
79	93.8	94.3	93.5	92.8	95.5
80	93.5	94.8	93.7	94.0	93.3
81	93.6	93.9	94.1	92.2	92.5
82	----	95.8	94.0	----	95.2
83	93.1	94.0	94.0	94.3	94.6
84	92.5	94.0	93.8	91.0	91.6
85	94.0	95.1	94.8	93.2	93.0
86	94.1	95.0	95.0	94.2	94.0
87	91.0	94.7	----	----	91.8
88	92.5	95.6	----	----	----
99	96.5	95.4	96.2	94.5	93.3
100	91.5	93.6	91.7	92.0	91.8
101	90.4	94.9	96.4	93.5	94.0

TABLE AII.376

FINAL SKIN TEMPERATURE OUTSIDE GLOVE: FLIGHT 1
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	----	92.2	95.9	93.0	92.7
2	----	90.6	----	----	92.3
3	----	93.0	93.0	90.2	91.8
4	----	93.1	96.6	93.1	92.3
5	----	93.2	93.4	----	88.9
6	----	92.2	94.0	<90.0	<88.9
7	----	93.2	94.3	<90.0	<88.9
8	----	95.1	95.5	<90.0	96.2
9	----	95.5	95.1	94.4	91.7
10	----	93.8	95.2	<90.0	<88.9
11	----	94.1	93.0	92.9	91.8
12	----	95.7	95.5	94.0	94.7

TABLE AII.376 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
13	----	93.2	94.4	----	----
14	----	92.2	95.4	<90.0	89.7
15	----	90.7	93.2	----	----
16	----	91.2	94.8	----	----
17	----	(93.2)	96.3	95.0	94.7
18	----	94.4	92.5	90.0	92.1
19	----	93.2	93.0	92.8	----
20	----	92.3	90.6	----	----
21	----	96.5	94.8	92.0	93.4
22	----	91.8	96.0	91.8	90.8
90	----	94.0	94.5	90.8	90.6
91	----	94.8	96.9	92.7	93.2
92	----	92.5	93.1	<90.0	90.5

TABLE AII.377

FINAL SKIN TEMPERATURE OUTSIDE GLOVE: FLIGHT 2
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	<90.0	93.2	95.9	94.2	<90.0
24	<90.0	93.5	93.5	----	----
25	90.1	92.2	<90.0	<90.0	<90.0
26	<90.0	93.2	91.5	93.2	<90.0
27	<90.0	----	92.3	93.1	<90.0
28	<90.0	91.0	94.2	91.2	<90.0
29	<90.0	94.1	94.3	93.4	<90.0
30	----	90.8	91.5	91.0	<90.0
31	<90.0	94.9	96.0	93.2	<90.0
32	<90.0	94.0	92.1	90.6	<90.0
33	<90.0	90.0	95.0	91.3	<90.0
34	<90.0	94.0	94.0	93.8	<90.0
35	<90.0	90.5	94.2	91.9	<90.0
36	<90.0	95.1	93.9	92.8	93.1
37	<90.0	95.7	94.0	91.9	<90.0
38	<90.0	92.8	95.0	91.8	<90.0
39	<90.0	92.3	92.0	----	----
40	<90.0	(93.2)	----	<90.0	<90.0
41	<90.0	95.2	----	----	<90.0
42	90.2	93.1	94.2	90.8	<90.0
43	<90.0	95.0	95.1	<90.0	<90.0
44	<90.0	93.5	94.8	<90.0	<90.0
93	<90.0	----	----	----	----
94	<90.0	95.2	90.8	<90.0	<90.0
95	<90.0	94.5	93.9	<90.0	90.2
102	----	----	----	----	92.9

TABLE AII.378

FINAL SKIN TEMPERATURE OUTSIDE GLOVE: FLIGHT 3
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	90.1	92.8	<90.0	93.5	91.2
46	<90.0	94.8	<90.0	93.1	93.4
47	<90.0	94.3	<90.0	94.0	90.9
48	<90.0	93.9	<90.0	98.1	91.0
49	<90.0	93.0	<90.0	<90.0	96.0
50	<90.0	93.7	91.6	95.5	91.3
51	91.2	94.4	<90.0	93.9	90.9
52	<90.0	95.0	<90.0	92.1	<90.0
53	<90.0	94.5	<90.0	94.2	91.3
54	<90.0	95.4	<90.0	93.2	91.3
55	<90.0	95.4	95.0	95.6	93.2
56	<90.0	96.7	91.2	95.2	93.4
57	<90.0	94.9	94.8	94.5	91.2
58	<90.0	(94.4)	----	95.8	91.3
59	----	(94.4)	<90.0	95.7	94.2
60	<90.0	94.0	<90.0	95.8	<90.0
61	<90.0	96.0	<90.0	96.2	90.6
62	<90.0	91.2	<90.0	93.4	<90.0
63	<90.0	94.2	<90.0	91.7	92.2
64	<90.0	95.5	<90.0	92.6	<90.0
65	<90.0	92.8	92.8	93.5	92.7
66	<90.0	95.8	<90.0	<90.0	92.6
96	<90.0	91.2	<90.0	92.1	90.2
97	94.7	98.5	94.5	96.0	94.7
98	92.5	96.6	<90.0	94.7	93.3

TABLE AII.379

FINAL SKIN TEMPERATURE OUTSIDE GLOVE: FLIGHT 4
(°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	<90.0	93.8	92.5	94.7	<90.0
68	<90.0	96.4	<90.0	91.0	----
69	<90.0	92.1	94.2	94.0	92.8
70	<90.0	92.1	<90.0	92.1	<90.0
71	<90.0	94.6	91.8	91.8	92.2
72	<90.0	96.8	92.2	93.6	92.2
73	<90.0	93.0	91.0	----	----
74	<90.0	93.2	<90.0	90.0	91.2
75	<90.0	90.7	<90.0	<90.0	91.8
76	<90.0	93.4	92.9	92.0	94.8
77	<90.0	93.1	----	----	----
78	<90.0	94.0	<90.0	91.0	91.6

TABLE AII.379 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
79	<90.0	96.0	94.6	94.2	92.3
80	<90.0	94.9	<90.0	90.5	91.6
81	<90.0	95.0	92.8	<90.0	94.5
82	----	94.0	90.0	----	93.8
83	<90.0	92.3	<90.0	92.2	92.8
84	<90.0	93.1	90.2	<90.0	91.4
85	<90.0	93.6	<90.0	93.3	93.9
86	<90.0	92.9	92.4	<90.0	94.2
87	<90.0	95.2	----	----	94.0
88	<90.0	94.3	----	----	----
99	<90.0	94.5	93.3	<90.0	94.0
100	<90.0	93.0	<90.0	90.0	93.3
101	<90.0	95.4	92.2	91.7	95.9

TABLE AII.380

EXERCISE INCREMENT OF SKIN TEMPERATURE
OUTSIDE GLOVE: FLIGHT 1
(^{o}F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	----	+0.2	+0.9	+3.0	+3.8
2	----	-2.1	----	----	+1.0
3	----	-2.4	-1.5	-2.2	+0.5
4	----	-2.2	+0.4	+1.2	+1.0
5	----	-3.4	-2.5	----	-3.1
6	----	-1.8	-1.9	> -3.0	>-0.9
7	----	-1.1	-2.0	> -3.8	>-2.1
8	----	+0.1	-0.3	> -2.4	+6.4
9	----	+0.0	+0.3	+4.1	+1.0
10	----	-2.4	+0.3	> -3.5	>-4.1
11	----	+1.0	-2.0	+1.9	+1.3
12	----	+1.3	-0.1	>+4.0	+4.9
13	----	00.0	-1.4	----	----
14	----	-3.2	+1.6	----	-2.0
15	----	-3.2	-1.2	----	----
16	----	-3.7	-0.2	----	----
17	----	(-1.5)	+5.3	+4.0	+4.4
18	----	0.0	-3.4	-3.0	-0.3
19	----	-2.4	-1.6	+0.9	----
20	----	-4.4	-4.2	----	----
21	----	+1.7	+1.0	-0.3	+0.9
22	----	-3.7	+0.6	+1.8	-2.9
90	----	-1.9	0.0	-1.7	-3.2
91	----	+0.4	+2.8	-0.5	+0.3
92	----	-2.5	-1.4	> -3.4	-1.0

TABLE AII.381

EXERCISE INCREMENT OF SKIN TEMPERATURE
OUTSIDE GLOVE: FLIGHT 2
(°F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	>-1.4	0.0	+1.9	+1.5	>-2.9
24	>-3.1	-2.5	-2.7	----	----
25	-2.7	-3.4	>-5.8	>-3.6	>-3.1
26	>-2.3	-1.0	-3.5	-0.4	>-3.4
27	>-3.1	----	-2.7	+0.2	>-4.5
28	>-2.8	-3.5	-0.4	-2.3	>-4.5
29	>-0.7	+1.1	-0.9	-1.0	>-3.6
30	----	-5.5	-4.2	-2.0	>-3.8
31	>-0.2	+1.6	-1.0	+2.0	>-3.2
32	>-1.5	-1.0	-3.4	-3.5	>-3.2
33	>-2.6	-4.0	-0.2	-2.7	>-5.4
34	>-1.3	0.0	-0.9	-0.8	>-4.9
35	>-3.2	-4.0	-1.2	-3.0	>-5.2
36	>-1.3	+0.9	-0.2	-0.7	-1.0
37	>-4.8	-0.5	-0.5	-2.3	>-5.3
38	>-3.2	-1.2	+1.1	-1.9	>-3.2
39	>-2.6	-2.7	-3.3	----	----
40	>-3.4	(-1.5)	----	>-2.2	>-3.9
41	>-2.8	-0.9	----	----	>-5.2
42	-4.1	-2.7	-1.1	-4.2	>-5.6
43	>-3.8	-0.2	+0.2	>-3.7	>-4.0
44	>-2.2	-0.5	-0.1	>-2.7	>-4.6
93	>-1.8	----	----	----	----
94	>-2.2	+0.7	-2.7	>-3.3	>-3.9
95	>-1.8	-0.5	-0.6	>-3.4	-5.3
102	----	----	----	----	-2.3

TABLE AII.382

EXERCISE INCREMENT OF SKIN TEMPERATURE
OUTSIDE GLOVE: FLIGHT 3
(°F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	-4.7	-2.4	>-5.3	+1.9	<+1.2
46	>-3.2	-0.2	>-5.3	+1.8	+2.1
47	>-2.3	0.0	>-4.5	+1.4	-1.5
48	>-3.8	-2.1	>-5.2	+6.1	-1.0
49	>-3.4	+1.0	>-4.3	>-3.0	+2.8
50	>-2.0	-1.2	-0.9	+1.9	-1.8
51	-2.0	+0.5	>-2.0	+2.5	-1.4
52	>-3.2	+1.4	>-4.3	+0.1	>-2.9
53	>-3.0	+0.7	>-2.8	+1.5	>-2.4
54	>-2.6	+2.2	>-3.8	+1.2	-0.7

TABLE AII.382 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
55	>-4.7	-0.6	+2.0	+1.5	-0.7
56	>-3.2	+2.9	-1.6	+1.4	+1.4
57	>-4.0	-0.3	+1.8	+1.0	-1.8
58	>-3.5	(+2.9)	----	+2.8	-2.4
59	----	(+2.9)	>-2.6	+2.8	+1.4
60	>-3.2	+2.4	>-1.6	+2.1	>-3.6
61	>-3.7	0.0	>-2.9	+1.9	-3.2
62	>-4.4	-2.3	>-1.9	+1.2	>-0.4
63	>-4.5	+0.2	>-3.0	-1.3	-0.8
64	>-4.2	-0.1	>-3.8	+0.9	>-4.1
65	>-3.5	-1.0	-2.2	-0.1	+0.1
66	>-3.4	+1.8	>-3.1	>-2.3	-0.9
96	>-4.3	-4.4	>-4.2	-1.9	-3.3
97	+0.4	+5.1	+1.4	+3.4	+3.3
98	-3.2	+2.3	>-3.2	+2.8	+0.8

TABLE AII.383

EXERCISE INCREMENT OF SKIN TEMPERATURE
OUTSIDE GLOVE: FLIGHT 4
(°F/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	>-4.5	-1.8	-2.4	+0.8	>-1.5
68	>-2.4	-1.4	>-4.5	-4.6	----
69	>-2.3	-2.0	-0.9	+0.3	+0.5
70	>-4.5	-3.2	>-4.6	-1.7	>-5.0
71	>-3.7	+0.1	-2.7	-0.4	-2.1
72	----	+1.8	-2.6	-0.1	-2.0
73	>-2.6	-1.8	-3.0	----	----
74	>-1.0	-0.5	>-1.7	-2.6	-1.6
75	>-2.0	-3.7	>-3.7	>-1.8	-0.5
76	>-3.8	-1.8	-1.6	-0.8	+1.2
77	>-3.8	-1.6	----	----	----
78	>-3.3	-2.0	>-5.0	-2.9	-0.6
79	>-3.8	+1.7	+1.1	+1.4	-3.2
80	>-3.5	+0.1	>-3.7	-3.5	-1.7
81	>-3.6	+1.1	-1.3	>-2.2	+2.0
82	----	-1.8	>-4.0	----	-1.4
83	>-3.1	-1.7	>-4.0	-2.1	-1.8
84	>-2.5	-0.9	-3.6	>-1.0	-0.2
85	>-4.0	-1.5	>-4.8	+0.1	+0.9
86	>-4.1	-2.1	-2.6	>-4.2	+0.2
87	>-1.0	+0.5	----	----	+2.2
88	>-2.5	-1.3	----	----	----
99	>-6.5	-0.9	-2.9	>-4.5	+0.7
100	>-1.5	-0.6	>-1.7	-2.0	+1.5
101	>-0.4	+0.5	-4.2	-1.8	+1.9

TABLE AII.384

RATE OF TOTAL BODY SWEATING: FLIGHT 1
(ml/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	759	925	864	680	794
2	638	897	---	---	788
3	486	780	750	624	567
4	971	1128	721	879	1162
5	547	780	692	---	652
6	627	879	922	652	709
7	657	1021	886	680	879
8	687	1211	864	907	822
9	239	1049	1095	794	907
10	447	964	836	652	765
11	864	1021	850	907	850
12	636	964	936	794	822
13	404	850	765	---	---
14	692	964	992	765	765
15	778	1049	1049	---	---
16	510	879	850	---	---
17	794	---	992	794	794
18	482	964	1021	822	964
19	539	850	850	765	---
20	454	850	794	---	---
21	454	838	907	624	624
22	482	863	1049	765	765
90	539	939	992	737	680
91	567	1219	1106	936	822
92	482	838	850	652	709

TABLE AII.385

RATE OF TOTAL BODY SWEATING: FLIGHT 2
(ml/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	577	1077	850	765	737
24	519	822	680	---	---
25	635	964	765	737	709
26	635	907	737	652	737
27	577	---	680	652	482
28	577	992	822	765	680
29	692	1049	850	822	879
30	(968)	907	822	822	709
31	692	1077	(1077)	936	765
32	605	1219	709	652	595
33	692	1021	850	794	765
34	543	794	829	652	709

TABLE AII.385 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
35	543	964	680	765	595
36	629	1077	879	978	907
37	486	964	794	737	595
38	514	964	879	850	737
39	510	936	822	---	---
40	425	(968)	---	709	709
41	369	879	---	---	652
42	482	907	737	652	737
43	510	879	737	652	595
44	482	964	822	652	624
93	454	---	---	---	---
94	737	1247	1389	1077	1049
95	567	1077	992	992	737
102	---	---	---	---	624

TABLE AII.386

RATE OF TOTAL BODY SWEATING: FLIGHT 3
(ml/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	567	1134	624	765	709
46	794	1219	737	879	822
47	624	1162	709	1049	850
48	652	1077	737	652	794
49	510	1021	680	822	765
50	539	907	652	850	794
51	709	1021	709	936	794
52	567	964	822	907	936
53	567	992	624	709	709
54	595	1219	822	907	907
55	595	907	680	794	765
56	850	1417	1049	1191	1106
57	737	1219	794	1077	936
58	652	(1147)	---	936	765
59	(665)	1147	794	794	680
60	680	1247	1106	1162	907
61	709	1247	765	850	680
62	879	1332	822	1106	822
63	737	1219	850	907	907
64	680	1106	680	964	850
65	680	1389	870	1134	907
66	652	1134	939	992	1049
96	680	1134	659	1191	964
97	1021	1588	1187	1276	1191
98	765	1191	896	1106	907

TABLE AII.387

RATE OF TOTAL BODY SWEATING: FLIGHT 4
(ml/hr)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	692	1106	680	907	879
68	375	794	624	737	---
69	144	964	567	765	709
70	231	1162	794	992	907
71	577	1021	794	907	850
72	750	907	765	794	879
73	663	822	652	---	---
74	980	1106	964	1021	992
75	750	907	680	907	1077
76	1095	936	652	765	680
77	663	992	---	---	---
78	807	1191	822	992	936
79	548	1049	680	794	1219
80	721	1162	737	737	992
81	605	850	454	737	709
82	(659)	964	624	---	709
83	605	992	794	879	879
84	605	964	539	765	794
85	663	1134	850	1417	822
86	692	1049	822	1644	822
87	922	1247	---	---	1021
88	750	1049	---	---	---
99	635	907	850	822	822
100	1182	1219	1077	1021	964
101	404	1191	936	964	936

TABLE AII.388

CORRECTED RATE OF SWEATING: FLIGHT 1
(ml/hr/65 kg)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	757	923	862	678	792
2	610	858	---	---	754
3	530	851	818	681	619
4	845	981	627	765	1011
5	619	883	783	---	738
6	603	846	887	627	682
7	598	929	806	619	800
8	704	1241	886	930	842
9	191	839	876	635	726
10	466	1004	871	679	797
11	811	959	798	852	798
12	539	805	782	663	686

TABLE AII.388 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
13	394	829	746	---	---
14	688	959	987	761	761
15	694	936	936	---	---
16	536	925	894	---	---
17	581	(438)	726	581	581
18	530	1060	1123	904	1060
19	610	962	962	866	---
20	494	924	863	---	---
21	485	896	970	667	667
22	502	937	1093	797	797
90	479	834	868	633	585
91	479	1012	911	765	666
92	495	851	845	644	700

TABLE AII.389

CORRECTED RATE OF SWEATING: FLIGHT 2
(ml/hr/65 kg)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	482	899	710	639	615
24	641	1016	840	---	---
25	618	938	744	717	690
26	770	1100	894	791	894
27	714	---	807	807	597
28	579	995	824	767	682
29	605	917	743	718	768
30	(978)	915	829	829	715
31	547	851	(851)	739	604
32	634	1278	743	743	624
33	686	1013	843	788	759
34	586	857	895	704	765
35	567	1007	711	799	622
36	647	1107	904	1005	932
37	506	1004	827	770	620
38	492	923	842	814	706
39	545	1001	879	---	---
40	412	(939)	---	688	688
41	400	952	---	---	706
42	475	894	727	643	727
43	526	907	967	673	614
44	486	973	829	658	630
93	---	---	---	---	---
94	609	1050	1133	866	835
95	478	909	830	821	608
102	---	---	---	---	---

TABLE AII.390

CORRECTED RATE OF SWEATING: FLIGHT 3
(ml/hr/65 kg)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	567	1134	624	765	709
46	691	1061	641	765	715
47	589	1097	669	990	802
48	550	909	622	550	670
49	523	1048	698	843	785
50	585	985	708	874	862
51	596	858	596	786	667
52	541	921	785	866	894
53	577	1010	635	722	722
54	593	1214	819	903	903
55	689	1050	787	919	886
56	834	1390	1029	1168	1085
57	674	1114	726	984	856
58	630	---	---	905	740
59	---	---	822	822	704
60	567	1040	922	969	756
61	668	1175	721	801	641
62	811	1229	759	1021	759
63	648	1072	747	797	797
64	577	938	577	817	721
65	590	1204	754	983	786
66	572	996	824	871	921
96	526	880	504	903	730
97	856	1348	999	1080	1008
98	771	1191	885	1091	883

TABLE AII.391

CORRECTED RATE OF SWEATING: FLIGHT 4
(ml/hr/65 kg)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	734	1172	721	961	932
68	366	774	608	719	---
69	141	946	556	750	696
70	224	1127	770	962	880
71	599	1060	824	941	882
72	705	853	719	746	826
73	719	892	707	---	---
74	905	1021	890	942	916
75	692	837	628	837	994
76	1266	1082	753	884	786
77	671	1004	---	---	---
78	745	1099	759	916	864

TABLE AII.391 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
79	539	1032	669	781	1119
80	746	1203	763	763	1027
81	585	822	439	713	686
82	---	1033	669	---	760
83	606	993	795	880	880
84	615	979	548	772	807
85	621	1061	796	1326	769
86	727	1101	863	1726	863
87	680	919	---	---	752
88	736	1029	---	---	---
99	627	884	816	784	784
100	909	935	825	785	736
101	403	1174	920	944	916

TABLE AII.392

ACCLIMATIZATION INDEX: FLIGHT 1
(ml sweat/oF)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	261	369	431	522	660
2	152	715	---	---	1508
3	189	709	545	757	563
4	338	363	314	850	842
5	269	589	652	---	615
6	201	497	522	570	401
7	332	774	620	619	533
8	352	1773	886	930	468
9	71	559	876	635	484
10	233	717	622	617	724
11	312	457	420	1217	499
12	299	402	558	947	457
13	158	360	497	---	---
14	275	457	548	692	476
15	289	347	669	---	---
16	185	487	813	---	---
17	194	---	484	447	528
18	166	623	1123	502	883
19	359	601	1603	541	---
20	165	544	575	---	---
21	303	640	570	834	445
22	228	551	993	724	443
90	199	521	868	576	532
91	165	724	911	765	476
92	248	655	1056	644	636

TABLE AII.393

ACCLIMATIZATION INDEX: FLIGHT 2
(ml sweat/°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	172	374	418	456	342
24	493	484	600	---	---
25	475	521	413	552	431
26	321	611	428	494	426
27	298	---	734	404	373
28	322	585	485	852	426
29	504	483	572	653	512
30	---	352	488	691	420
31	288	741	---	739	431
32	423	672	572	675	446
33	254	362	422	525	584
34	209	659	426	640	546
35	189	592	395	726	415
36	166	277	452	837	405
37	230	837	435	770	564
38	224	440	301	678	504
39	248	910	463	---	---
40	294	---	---	688	328
41	174	501	---	---	471
42	119	638	330	536	519
43	263	504	358	673	472
44	174	748	436	598	394
93	---	---	---	---	---
94	217	657	710	666	596
95	217	758	1028	747	358
102	---	---	---	---	---

TABLE AII.394

ACCLIMATIZATION INDEX: FLIGHT 3
(ml sweat/°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	145	630	312	850	472
46	288	2122	534	588	893
47	235	645	557	618	729
48	211	757	777	550	744
49	261	349	872	843	714
50	172	657	354	794	784
51	314	613	397	982	741
52	361	542	392	577	745
53	288	561	423	516	602
54	296	934	390	1806	602
55	363	350	394	368	682
56	596	695	2058	779	1206

TABLE AII.394 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
57	355	696	484	428	951
58	394	---	---	---	---
59	---	---	1174	632	1408
60	196	433	512	373	582
61	418	588	481	1001	493
62	253	768	843	681	632
63	202	315	498	664	569
64	304	426	1154	389	801
65	236	523	302	492	524
66	197	498	412	436	614
96	239	463	360	531	521
97	317	642	832	830	1260
98	335	702	681	682	676

TABLE AII.395

ACCLIMATIZATION INDEX: FLIGHT 4
(ml sweat/°F)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	367	586	379	686	847
68	104	455	304	513	---
69	47	430	292	777	994
70	93	626	513	740	880
71	272	461	412	855	882
72	252	426	360	678	826
73	360	405	372	---	---
74	323	537	494	942	916
75	407	493	209	930	904
76	904	470	358	956	873
77	395	456	---	---	---
78	213	578	292	584	864
79	359	543	352	976	1865
80	298	668	424	1526	1027
81	450	484	220	548	490
82	---	382	669	---	---
83	319	397	723	677	880
84	236	426	288	772	807
85	414	816	419	947	769
86	454	1223	1079	1328	863
87	378	418	---	---	---
88	283	447	---	---	---
99	314	354	453	652	603
100	606	719	434	523	525
101	367	692	541	1180	2285

TABLE AII.397 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
35	0.44	0.33	0.27	0.34	0.33
36	0.60	0.48	0.17	0.38	0.46
37	0.52	0.38	0.30	0.38	0.60
38	0.85	0.58	0.35	0.55	0.83
39	0.92	0.63	0.30	----	----
40	1.18	(0.47)	----	0.98	2.36
41	0.77	0.35	----	----	0.55
42	0.62	0.36	0.51	0.34	0.59
43	0.43	0.41	0.50	0.38	0.40
44	1.04	0.52	0.50	0.76	1.66
93	0.84	----	----	----	----
94	1.15	1.61	0.54	0.74	1.84
95	0.57	0.44	0.30	0.38	0.67
102	----	----	----	----	0.99

TABLE AII.398

RATE OF URINE FLOW IN EXERCISE: FLIGHT 3
(ml/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	0.63	0.27	0.27	0.56	0.38
46	0.33	0.19	0.18	0.15	0.23
47	0.40	0.29	0.19	0.20	0.25
48	1.07	0.23	0.18	----	----
49	0.60	0.34	1.76	0.21	0.41
50	0.42	0.23	0.47	0.10	0.27
51	(0.57)	0.14	0.26	0.27	0.26
52	0.44	0.28	1.10	0.42	0.27
53	0.53	0.23	3.54	0.19	0.40
54	0.48	0.48	0.29	0.24	0.44
55	0.24	0.25	0.41	0.31	0.31
56	0.35	0.52	1.97	0.31	0.38
57	0.36	0.27	1.06	0.30	0.45
58	0.48	(0.39)	----	0.38	0.79
59	(0.57)	(0.39)	----	----	0.37
60	0.39	0.19	0.52	0.29	0.20
61	0.60	0.96	0.46	0.83	0.45
62	1.20	0.32	1.25	0.42	0.54
63	0.34	0.19	3.14	0.48	0.35
64	0.91	1.74	3.02	0.26	0.41
65	1.14	0.31	0.49	0.42	0.38
66	0.54	0.40	0.57	0.53	0.52
96	0.61	0.62	0.78	0.82	1.26
97	0.58	0.26	0.84	0.54	0.66
98	0.52	0.46	0.72	0.94	1.22

TABLE AII.396

RATE OF URINE FLOW IN EXERCISE: FLIGHT 1
(ml/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	0.38	0.24	0.14	0.50	0.30
2	0.44	0.36	----	----	1.22
3	1.45	0.19	0.19	0.27	1.38
4	0.45	0.34	0.23	0.32	0.34
5	0.70	0.28	1.53	----	0.39
6	1.07	0.43	0.30	0.45	0.38
7	3.54	0.78	5.59	0.70	0.58
8	2.77	0.54	1.63	0.41	0.53
9	0.42	0.37	0.73	0.32	0.35
10	0.59	0.28	0.43	0.34	0.28
11	0.38	0.31	0.58	1.50	0.54
12	0.42	0.31	3.02	0.31	0.47
13	0.43	0.37	0.26	----	----
14	0.80	0.51	0.37	0.46	0.52
15	0.46	0.34	0.35	----	----
16	0.44	0.29	1.34	----	----
17	0.33	(0.37)	0.23	0.25	2.10
18	0.48	0.32	0.42	0.25	0.40
19	0.44	0.32	0.23	----	----
20	0.61	0.33	0.39	----	----
21	0.57	0.38	0.73	0.32	0.65
22	0.88	0.54	0.38	0.31	0.41
90	0.66	0.37	0.57	0.41	0.54
91	0.68	0.69	0.69	0.58	0.36
92	0.95	0.62	0.94	0.84	1.26

TABLE AII.397

RATE OF URINE FLOW IN EXERCISE: FLIGHT 2
(ml/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	0.85	0.33	0.30	0.44	1.05
24	0.73	0.39	0.19	----	----
25	0.75	0.48	0.29	0.26	0.18
26	0.56	0.38	0.28	0.24	0.31
27	0.77	----	0.17	0.57	0.55
28	0.56	0.60	0.27	0.33	0.37
29	0.56	0.44	0.15	0.36	0.36
30	(0.47)	0.53	0.16	0.33	0.35
31	0.53	0.79	----	0.76	0.86
32	0.60	0.42	0.51	0.35	----
33	1.09	0.56	0.79	0.85	0.35
34	0.51	0.40	0.81	0.35	0.39

TABLE AII.402

RATE OF URINE FLOW AFTER EXERCISE: FLIGHT 3
(ml/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	0.50	0.58	0.46	0.57	0.55
46	0.70	0.45	0.44	0.40	0.47
47	0.75	0.63	0.39	0.63	0.67
48	1.00	0.25	0.62	----	----
49	0.86	0.47	0.44	0.33	0.20
50	0.80	0.56	0.23	0.35	0.53
51	1.00	0.27	0.17	0.52	0.50
52	0.33	0.37	0.22	0.47	0.42
53	0.40	0.40	0.57	0.30	0.50
54	0.46	0.87	0.37	0.50	0.58
55	0.33	0.30	0.57	0.20	0.43
56	0.42	0.22	4.97	0.57	0.40
57	0.50	0.31	0.43	0.53	0.62
58	0.58	(0.55)	----	0.67	1.20
59	(0.57)	(0.55)	----	----	0.77
60	0.33	0.33	0.27	0.53	0.66
61	0.39	0.65	0.38	0.68	0.38
62	0.24	0.50	1.23	0.41	0.75
63	0.38	0.30	1.47	0.70	0.48
64	0.38	2.63	2.44	1.10	2.00
65	0.90	0.44	0.50	0.50	0.38
66	0.67	0.47	0.60	1.07	0.93
96	0.73	0.78	1.10	1.30	1.67
97	0.91	0.39	0.87	0.77	0.63
98	0.93	0.45	0.97	1.57	1.33

TABLE AII.403

RATE OF URINE FLOW AFTER EXERCISE: FLIGHT 4
(ml/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	1.10	0.60	0.67	1.20	1.00
68	0.67	0.47	0.40	0.75	----
69	0.90	0.50	----	0.70	0.93
70	0.83	0.20	0.35	0.27	0.33
71	1.00	0.57	0.30	0.72	0.80
72	1.17	0.73	0.28	1.12	1.13
73	0.77	0.47	0.20	----	----
74	0.90	0.36	0.25	1.37	0.67
75	1.00	0.50	0.55	1.75	0.87
76	1.03	0.33	0.83	0.70	0.60
77	0.87	0.50	----	----	----
78	1.17	0.67	0.80	1.15	0.73

TABLE AII.403 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
79	1.40	1.53	0.33	1.53	0.83
80	1.17	0.50	0.33	0.97	0.27
81	1.50	1.00	0.48	1.13	1.27
82	(1.04)	0.50	0.40	----	1.27
83	1.07	0.67	0.27	0.87	0.87
84	1.18	0.53	0.33	1.07	1.20
85	1.13	0.47	0.43	1.35	1.25
86	0.67	0.43	0.55	1.40	0.53
87	1.10	0.77	----	----	0.38
88	1.17	0.75	----	----	----
99	0.70	0.50	0.53	0.60	0.67
100	1.13	1.17	1.30	1.37	1.75
101	0.50	1.47	1.50	1.13	1.17

TABLE AII.404

KETONURIA IN EXERCISE: FLIGHT 1
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	0	0	-	0	0
2	0	0	-	-	0
3	0	0	+4	0	0
4	0	0	+4	0	0
5	0	0	0	-	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	+4	0	0
10	0	0	+4	0	0
11	0	0	+4	0	0
12	0	0	+3	0	0
13	0	0	+4	-	-
14	0	0	+3	0	0
15	0	0	0	-	-
16	0	0	0	-	-
17	0	-	0	0	0
18	0	0	0	0	0
19	0	0	0	0	0
20	0	0	0	-	-
21	0	0	0	0	0
22	0	0	0	0	0
90	0	0	0	0	0
91	0	0	0	0	0
92	0	0	0	0	0

TABLE AII.405

KETONURIA IN EXERCISE: FLIGHT 2
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	0	0	+4	0	0
24	0	0	+4	-	-
25	0	0	+4	0	0
26	0	0	+4	0	0
27	0	-	0	0	0
28	0	0	0	0	0
29	0	0	0	0	0
30	0	0	0	0	0
31	0	0	-	0	0
32	0	0	+4	0	0
33	0	0	0	0	0
34	0	0	+4	0	0
35	0	0	+4	0	0
36	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
39	0	0	0	-	-
40	0	-	-	0	0
41	0	0	-	-	0
42	0	0	0	0	0
43	0	0	0	0	0
44	0	0	0	0	0
93	0	-	-	-	-
94	0	0	0	0	0
95	0	0	0	0	0
102	-	-	-	-	0

TABLE AII.406

KETONURIA IN EXERCISE: FLIGHT 3
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	0	0	+4	0	0
46	0	0	+4	0	0
47	0	0	+4	0	0
48	0	0	+4	0	0
49	0	0	0	0	0
50	0	0	0	-	0
51	-	0	0	0	0
52	0	0	+4	0	0
53	0	0	+3	0	0
54	0	0	+4	0	0
55	0	0	0	0	0

TABLE AII.406 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
56	0	0	+1	0	0
57	0	0	+2	0	0
58	0	-	-	0	0
59	-	-	0	-	0
60	0	0	0	0	0
61	0	0	0	0	0
62	0	0	0	0	0
63	0	0	0	0	0
64	0	0	0	0	0
65	0	0	0	0	0
66	0	0	0	0	0
96	0	0	0	0	0
97	0	0	0	0	0
98	0	0	0	0	0

TABLE AII.407

KETONURIA IN EXERCISE: FLIGHT 4
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	0	0	+4	0	0
68	0	0	+4	0	-
69	0	0	-	0	0
70	0	0	+4	-	0
71	0	0	0	0	0
72	0	0	0	0	0
73	0	0	0	-	-
74	0	0	0	0	0
75	0	0	+4	0	0
76	0	0	+4	0	0
77	0	-	-	-	-
78	0	0	0	0	0
79	0	0	+3	0	0
80	0	0	0	0	0
81	0	0	+4	0	0
82	-	0	0	-	0
83	0	0	0	0	0
84	0	0	0	0	0
85	0	0	0	0	0
86	0	0	0	0	0
87	0	0	-	-	0
88	0	0	-	-	-
99	0	0	0	0	0
100	0	0	0	0	0
101	0	0	0	0	0

TABLE AII.408

KETONURIA AFTER EXERCISE: FLIGHT 1
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	0	0	-	0	0
2	0	0	-	-	0
3	0	0	+4	-	0
4	0	0	+4	0	0
5	0	0	0	-	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	+4	0	-
10	0	0	+3	0	0
11	0	0	+3	0	0
12	0	0	+4	0	0
13	0	0	+4	-	-
14	0	0	0	0	0
15	0	0	0	-	-
16	0	0	0	-	-
17	0	-	0	0	0
18	0	0	0	0	0
19	0	0	0	0	0
20	0	0	0	-	-
21	0	0	0	0	0
22	0	0	0	0	0
90	0	0	0	0	0
91	0	0	0	0	0
92	0	0	0	0	0

TABLE AII.409

KETONURIA AFTER EXERCISE: FLIGHT 2
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	0	0	+4	0	0
24	0	0	+4	-	-
25	0	0	+4	0	0
26	0	0	+4	0	0
27	0	-	0	0	0
28	0	0	0	0	0
29	0	0	0	0	0
30	0	0	0	0	0
31	0	0	+4	0	0
32	0	0	+4	0	0
33	0	0	0	0	0
34	0	0	+3	0	0

TABLE AII.409 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
35	0	0	+4	0	0
36	0	0	+3	0	0
37	0	0	0	0	0
38	0	0	0	0	0
39	0	0	0	-	-
40	0	-	-	0	0
41	0	0	-	-	0
42	0	0	0	0	0
43	0	0	0	0	0
44	0	0	0	0	0
93	0	-	-	-	-
94	0	0	0	0	0
95	0	0	0	0	0
102	-	-	-	-	0

TABLE AII.410

KETONURIA AFTER EXERCISE: FLIGHT 3
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	0	0	+4	0	0
46	0	0	+4	0	0
47	0	0	+4	0	0
48	0	0	+4	0	0
49	0	0	+1	0	0
50	0	0	0	0	0
51	0	0	-	0	0
52	0	0	+4	0	0
53	0	0	+3	0	0
54	0	0	+4	-	0
55	0	0	+2	-	0
56	0	0	+1	0	0
57	0	0	+1	0	0
58	0	-	-	0	0
59	-	-	0	-	0
60	0	0	0	0	0
61	0	0	0	0	0
62	0	0	0	0	0
63	0	0	0	0	0
64	0	0	0	0	0
65	0	0	0	0	0
66	0	0	0	0	0
96	0	0	0	0	0
97	0	0	0	0	0
98	0	0	0	0	0

TABLE AII.411

KETONURIA AFTER EXERCISE: FLIGHT 4
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	0	0	+3	0	0
68	0	0	+4	0	-
69	0	0	+3	0	0
70	0	0	+4	-	0
71	0	0	0	0	0
72	0	0	-	0	0
73	0	0	0	-	-
74	0	0	0	0	0
75	0	0	+4	0	0
76	0	0	+3	0	0
77	0	0	-	-	-
78	0	0	0	0	0
79	0	0	+3	0	0
80	0	0	+3	0	0
81	0	0	+2	0	0
82	-	0	+4	-	-
83	0	0	0	0	0
84	0	0	0	0	0
85	0	0	0	0	0
86	0	0	0	0	0
87	0	0	-	-	9
88	0	0	-	-	-
99	0	0	0	0	0
100	0	0	0	0	0
101	0	0	0	0	0

TABLE AII.412

ALBUMINURIA IN EXERCISE: FLIGHT 1
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	0	0	-	0	(pink)
2	0	0	-	-	0
3	0	0	0	0	+1
4	0	0	0	0	0
5	0	0	0	-	0
6	0	0	0	0	0
7	0	0	0	0	+2
8	0	0	tr	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	+1	0	0	0	0
12	+3	+4	+1	+3	+3

TABLE AII.412 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
13	0	0	0	-	-
14	0	0	0	0	0
15	0	0	0	-	-
16	0	0	+1	-	-
17	0	-	0	0	0
18	0	0	0	0	0
19	0	0	0	0	0
20	0	0	0	-	-
21	0	0	0	0	0
22	0	0	0	0	+2
90	0	0	0	0	0
91	0	0	0	0	0
92	0	0	0	+1	+1

TABLE AII.413

ALBUMINURIA IN EXERCISE: FLIGHT 2
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	0	0	0	0	0
24	0	0	0	-	-
25	0	0	0	0	0
26	0	0	0	0	0
27	0	-	0	0	0
28	0	0	0	0	0
29	0	0	0	+1	0
30	0	0	0	0	0
31	0	0	-	0	0
32	0	0	0	0	0
33	0	tr	0	+2	+2
34	0	0	0	0	0
35	0	0	0	0	0
36	0	0	0	0	0
37	+2	0	0	+2	0
38	0	0	0	0	0
39	0	0	0	-	-
40	0	-	-	0	0
41	0	tr	-	-	0
42	0	0	0	0	0
43	0	0	0	0	0
44	0	0	0	0	0
93	0	-	-	-	-
94	0	0	0	0	0
95	0	0	0	0	0
102	-	-	-	-	0

TABLE AII.414

ALBUMINURIA IN EXERCISE: FLIGHT 3
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	0	0	0	tr	0
46	tr	0	0	0	0
47	0	0	0	0	0
48	0	0	0	0	0
49	+1	0	tr	+1	0
50	0	0	0	-	0
51	-	0	0	0	0
52	0	0	0	0	(purple)
53	0	0	0	0	0
54	0	0	0	+1	0
55	0	0	0	0	0
56	0	0	0	+3	+3
57	0	0	0	0	+1
58	0	-	-	0	0
59	-	-	0	-	0
60	0	0	0	0	+3
61	0	0	0	0	0
62	0	0	0	+1	0
63	0	0	0	+1	0
64	0	0	0	0	0
65	0	0	0	0	0
66	0	0	0	0	0
96	0	0	0	0	0
97	0	0	0	0	0
98	0	0	0	+2	0

TABLE AII.415

ALBUMINURIA IN EXERCISE: FLIGHT 4
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	0	0	0	0	0
68	0	0	0	0	-
69	0	0	-	0	0
70	0	0	0	-	0
71	0	0	0	0	0
72	0	0	0	0	0
73	0	0	0	-	-
74	0	0	0	0	0
75	0	0	0	0	0
76	0	0	0	0	0
77	0	-	-	-	-
78	0	0	0	0	0

TABLE AII.415 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
79	0	0	0	0	0
80	0	0	0	0	0
81	0	0	0	0	0
82	-	0	0	-	0
83	0	0	0	0	0
84	0	0	0	+1	0
85	0	0	0	0	0
86	0	0	0	0	0
87	0	0	-	-	0
88	0	0	-	-	-
99	tr	0	0	0	0
100	0	0	0	0	0
101	0	0	0	0	0

TABLE AII.416

ALBUMINURIA AFTER EXERCISE: FLIGHT 1
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	0	0	-	0	0
2	0	0	-	-	0
3	0	0	0	-	0
4	0	0	0	(red)	0
5	0	0	0	-	0
6	0	0	0	(red)	0
7	0	tr	0	0	0
8	0	0	0	0	0
9	0	0	0	0	-
10	0	tr	0	0	+2
11	0	0	0	0	0
12	0	0	0	0	0
13	0	0	0	-	-
14	0	0	0	(pink)	0
15	0	tr	0	-	-
16	0	0	0	-	-
17	0	-	0	0	0
18	0	0	0	0	0
19	0	0	0	0	0
20	0	0	0	-	-
21	0	0	0	0	0
22	0	0	0	+1	0
90	0	0	0	0	0
91	0	0	0	0	0
92	0	0	0	0	0

TABLE AII.420

WHITE CELLS IN EXERCISE URINE: FLIGHT 1
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
1	6.3	22.4	700.0	12.0
2	14.2	---	---	0.0
3	4.2	18.0	0.0	5.0
4	163.2	38.0	90.0	14.0
5	3.7	61.0	---	5.0
6	11.4	4.0	0.0	5.0
7	0.0	75.0	0.0	8.0
8	0.0	44.0	5.0	14.0
9	1833.7	48.0	43.0	9.0
10	11.1	11.0	9.0	7.0
11	0.0	62.0	0.0	21.0
12	12.3	282.0	1294.0	858.0
13	4.9	59.0	---	---
14	0.0	10.0	0.0	0.0
15	14.5	28.0	---	---
16	7.6	71.0	---	---
17	---	22.0	20.0	28.0
18	25.7	179.0	10.0	5.0
19	42.6	16.0	---	---
20	934.6	1409.0	---	---
21	10.0	39.0	13.0	7.0
22	21.4	35.0	0.0	16.0
90	4.9	23.0	5.0	36.0
91	0.0	110.0	8.0	14.0
92	99.0	2469.0	56.0	17.0

TABLE AII.421

WHITE CELLS IN EXERCISE URINE: FLIGHT 2
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
23	594.0	724.0	657.0	504.0
24	608.4	81.0	---	---
25	32.2	58.0	7.0	12.0
26	25.5	41.0	0.0	0.0
27	---	2584.0	1930.0	2640.0
28	7.9	43.0	4.0	0.0
29	0.0	474.0	0.0	19.0
30	7.0	7.0	4.0	0.0
31	31.3	---	6.0	470.0
32	11.1	256.0	14.0	0.0
33	45.0	126.0	34.0	19.0
34	138.7	54.0	56.0	16.0

TABLE AII.421 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
35	22.2	137.0	14.0	18.0
36	16.7	143.0	10.0	12.0
37	10.0	176.0	5.0	8.0
38	224.1	42.0	93.0	11.0
39	100.5	12.0	---	---
40	---	---	91.0	0.0
41	0.0	---	---	7.0
42	0.0	190.0	0.0	1463.0
43	5.4	87.0	15.0	139.0
44	13.7	67.0	6.0	0.0
93	---	---	---	---
94	214.4	22.0	69.0	0.0
95	5.7	48.0	5.0	9.0
102	---	---	---	92.0

TABLE AII.422

WHITE CELLS IN EXERCISE URINE: FLIGHT 3
(Thousands/2 hr)

Subject Code No.	P II	EXP I	REC I	REC II
45	46.6	29.0	75.0	0.0
46	0.0	438.0	8.0	18.0
47	7.8	43.0	5.0	17.0
48	604.4	1378.0	---	---
49	90.6	305.0	25.0	355.0
50	128.9	64.0	16.0	0.0
51	5.5	25.0	11.0	0.0
52	7.4	44.0	6.0	0.0
53	30.6	47.0	15.0	5.0
54	44.9	12.0	10.0	276.0
55	2.3	17.0	12.0	4.0
56	20.6	26.0	0.0	106.0
57	0.0	42.0	0.0	6.0
58	---	---	5.0	0.0
59	---	---	---	0.0
60	2.5	7.0	4.0	0.0
61	89.8	0.0	0.0	216.0
62	0.0	0.0	224.0	7.0
63	1.0	0.0	0.0	0.0
64	91.9	40.0	3.0	33.0
65	0.0	13.0	0.0	132.0
66	5.3	85.0	7.0	0.0
96	0.0	489.0	0.0	17.0
97	10.3	22.0	7.0	0.0
98	73.4	39.0	38.0	0.0

TABLE AII.417

ALBUMINURIA AFTER EXERCISE: FLIGHT 2
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	0	0	0	(pink)	0
24	0	0	0	-	-
25	0	0	0	0	0
26	0	0	0	0	(pink)
27	0	-	0	0	0
28	0	0	0	0	(pink)
29	0	0	0	0	0
30	0	0	0	0	0
31	0	0	0	0	0
32	0	0	0	0	0
33	tr	0	0	0	0
34	0	0	0	0	+3
35	0	0	0	0	0
36	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
39	0	0	0	-	-
40	0	-	-	0	(pink)
41	0	+1	-	-	0
42	0	0	0	0	0
43	0	0	0	0	0
44	0	0	0	0	0
93	0	-	-	-	-
94	0	0	0	0	0
95	0	0	0	0	0
102	-	-	-	-	0

TABLE AII.418

ALBUMINURIA AFTER EXERCISE: FLIGHT 3
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	0	0	0	0	0
46	0	0	0	0	0
47	0	0	0	0	0
48	0	0	0	0	0
49	0	0	0	0	0
50	0	0	0	0	0
51	0	0	0	0	0
52	0	0	0	0	0
53	0	0	0	0	0
54	0	0	0	-	0
55	0	0	0	-	0

TABLE AII.418 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
56	0	0	0	0	+3
57	0	0	0	+1	0
58	0	-	-	0	0
59	-	-	0	-	0
60	0	0	0	0	(pink)
61	0	0	0	0	0
62	0	0	0	0	0
63	0	0	0	0	0
64	0	0	0	0	0
65	0	0	0	0	0
66	0	0	0	0	0
96	0	tr	0	0	0
97	0	0	0	0	0
98	0	0	0	0	0

TABLE AII.419

ALBUMINURIA AFTER EXERCISE: FLIGHT 4
(0 to +4)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	0	0	0	0	0
68	0	0	0	0	-
69	0	0	0	0	0
70	0	0	0	-	0
71	0	0	0	0	0
72	0	0	0	0	0
73	0	0	0	-	-
74	0	0	0	0	0
75	0	0	0	0	0
76	0	0	0	0	0
77	0	0	-	-	-
78	0	0	0	0	0
79	0	0	0	0	0
80	0	0	0	0	0
81	0	0	0	0	0
82	-	0	0	-	0
83	0	0	0	0	0
84	0	0	0	0	0
85	0	0	0	0	0
86	0	0	0	0	0
87	0	0	-	-	0
88	0	0	-	-	-
99	0	0	0	0	0
100	0	0	0	0	0
101	0	0	0	0	0

TABLE AII.399

RATE OF URINE FLOW IN EXERCISE: FLIGHT 4
(ml/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	0.36	0.28	0.34	0.41	0.26
68	0.66	0.37	0.48	0.56	----
69	0.75	0.38	----	0.38	0.49
70	0.45	0.28	0.32	0.12	0.15
71	0.64	0.38	0.34	0.54	0.49
72	0.74	0.43	0.37	0.49	0.58
73	0.29	0.19	1.51	----	----
74	0.12	0.48	0.20	0.57	0.36
75	0.37	0.32	0.62	0.68	0.49
76	0.39	0.18	0.67	0.37	0.24
77	0.67	(0.43)	----	----	----
78	0.51	0.52	0.60	0.81	0.44
79	0.82	1.52	0.32	0.86	0.48
80	0.80	0.43	0.31	0.45	0.25
81	1.02	0.57	0.34	0.44	1.18
82	(0.60)	0.30	0.25	----	0.70
83	0.85	0.47	0.35	0.48	0.43
84	0.76	0.40	0.31	0.60	0.54
85	0.61	0.30	----	0.60	1.06
86	0.43	0.27	0.38	0.53	0.33
87	0.81	0.53	----	----	0.34
88	0.62	0.40	----	----	----
99	0.38	0.40	0.60	0.37	0.35
100	1.43	0.95	1.70	1.19	1.94
101	1.65	0.73	1.12	1.67	1.30

TABLE AII.400

RATE OF URINE FLOW AFTER EXERCISE: FLIGHT 1
(ml/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	0.65	0.33	0.30	0.57	0.42
2	0.67	0.40	----	----	1.23
3	0.83	0.33	0.23	----	0.55
4	0.71	0.57	0.50	0.43	0.50
5	0.65	0.35	1.00	----	0.77
6	0.72	0.58	0.16	0.33	0.54
7	1.52	1.02	0.37	0.20	0.95
8	1.80	0.58	0.16	0.50	0.75
9	0.62	0.37	0.72	0.53	----
10	0.63	0.43	0.61	0.37	0.49
11	1.44	0.78	0.93	0.82	0.73
12	0.95	0.57	1.13	0.33	0.57

TABLE AII.400 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
13	0.71	0.50	0.26	----	----
14	1.05	0.83	0.36	0.42	0.72
15	1.04	0.53	0.45	----	----
16	0.13	0.73	0.73	----	----
17	1.00	(0.56)	0.33	0.42	0.50
18	1.29	0.52	0.29	0.30	0.60
19	0.94	0.28	0.36	----	----
20	1.04	0.43	0.46	----	----
21	1.87	0.58	0.70	0.53	0.70
22	1.46	1.02	0.57	0.40	0.72
90	1.07	0.63	0.90	0.63	0.83
91	0.96	0.88	1.57	0.87	0.85
92	1.40	0.92	1.55	1.25	1.58

TABLE AII.401

RATE OF URINE FLOW AFTER EXERCISE: FLIGHT 2
(ml/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	0.96	0.50	0.43	0.43	0.53
24	1.09	0.67	0.53	----	----
25	0.93	0.70	0.50	0.65	0.47
26	0.84	0.93	0.33	0.43	0.50
27	1.56	----	0.26	0.97	1.36
28	1.04	0.73	0.35	0.73	0.67
29	0.95	0.63	0.20	0.60	0.83
30	(0.76)	0.87	0.23	0.73	0.67
31	0.63	1.20	----	1.67	1.60
32	0.76	0.77	0.63	0.63	----
33	0.25	0.63	0.95	0.53	0.42
34	0.49	0.62	0.93	0.47	0.40
35	0.55	0.60	0.30	0.47	0.38
36	0.68	0.83	0.28	0.45	0.50
37	1.09	0.78	0.53	0.60	0.37
38	1.16	0.73	0.33	0.30	0.88
39	1.08	0.90	0.37	----	----
40	1.43	(0.76)	----	1.17	2.23
41	1.51	0.62	----	----	0.83
42	1.51	0.82	0.63	0.57	0.87
43	0.54	0.73	0.73	0.72	0.75
44	1.46	1.00	0.77	2.97	1.23
93	1.07	----	----	----	----
94	0.98	0.59	0.88	0.83	1.22
95	0.55	0.62	0.50	0.48	0.73
102	----	----	----	----	1.36

TABLE AII.423

WHITE CELLS IN EXERCISE URINE: FLIGHT 4
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
67	14.8	9.0	16.0	3.0
68	9.8	32.0	7.0	---
69	0.0	---	0.0	0.0
70	3.7	158.0	109.0	6.0
71	5.0	54.0	7.0	6.0
72	28.9	0.0	20.0	8.0
73	30.3	584.0	---	---
74	38.6	11.0	23.0	14.0
75	998.4	109.0	91.0	33.0
76	12.0	89.0	5.0	10.0
77	---	---	---	---
78	6.9	32.0	11.0	18.0
79	40.1	13.0	11.0	6.0
80	5.7	29.0	0.0	0.0
81	15.0	190.0	6.0	0.0
82	60.1	10.0	---	9.0
83	24.8	19.0	19.0	11.0
84	15.8	55.0	24.0	7.0
85	0.0	---	0.0	0.0
86	14.2	5.0	7.0	172.0
87	14.6	---	---	1414.0
88	0.0	---	---	---
99	1785.6	1496.0	2614.0	182.0
100	12.5	433.0	48.0	31.0
101	28.9	104.0	9.0	0.0

TABLE AII.424

WHITE CELLS IN POST-EXERCISE URINE: FLIGHT 1
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
1	0.0	108.0	0.0	12.0
2	10.6	---	---	0.0
3	0.0	37.0	---	0.0
4	22.6	67.0	11.0	7.0
5	4.6	27.0	---	10.0
6	23.0	13.0	9.0	0.0
7	3318.9	15.0	0.0	6.0
8	7.6	6.0	80.0	0.0
9	9.8	67.0	7.0	---
10	34.6	0.0	0.0	6.0
11	0.0	12.0	22.0	10.0
12	1374.8	708.0	1298.0	1155.0

TABLE AII.424 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
13	0.0	21.0	---	---
14	0.0	14.0	0.0	0.0
15	0.0	0.0	---	---
16	9.6	78.0	---	---
17	---	9.0	78.0	0.0
18	0.0	112.0	16.0	0.0
19	0.0	29.0	---	---
20	1929.8	1103.0	---	---
21	92.6	19.0	49.0	9.0
22	0.0	15.0	16.0	0.0
90	0.0	36.0	8.0	111.0
91	11.6	21.0	0.0	0.0
92	12.1	62.0	0.0	0.0

TABLE AII.425

WHITE CELLS IN POST-EXERCISE URINE: FLIGHT 2
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
23	864.0	791.0	224.0	85.0
24	8.8	64.0	---	---
25	56.3	80.0	0.0	19.0
26	24.6	50.0	29.0	0.0
27	---	3006.0	2186.0	5905.0
28	0.0	14.0	0.0	0.0
29	72.8	208.0	0.0	11.0
30	34.4	15.0	0.0	0.0
31	63.3	---	67.0	832.0
32	30.5	42.0	59.0	3.0
33	294.8	12.0	0.0	0.0
34	164.2	25.0	0.0	0.0
35	7.9	4.0	19.0	5.0
36	0.0	7.0	6.0	7.0
37	62.7	7.0	0.0	5.0
38	213.7	4.0	0.0	0.0
39	11.9	10.0	---	---
40	---	---	0.0	0.0
41	1361.5	---	---	---
42	32.5	59.0	99.0	2158.0
43	0.0	30.0	10.0	300.0
44	39.6	20.0	0.0	0.0
93	---	---	---	---
94	15.6	0.0	0.0	0.0
95	24.6	13.0	77.0	0.0
102	---	---	---	109.0

TABLE AII.426

WHITE CELLS IN POST-EXERCISE URINE: FLIGHT 3
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
45	0.0	43.0	8.0	0.0
46	0.0	18.0	16.0	19.0
47	0.0	52.0	50.0	9.0
48	106.8	107.0	---	---
49	37.8	188.0	31.0	162.0
50	7.4	9.0	47.0	0.0
51	3.6	15.0	7.0	0.0
52	0.0	23.0	0.0	0.0
53	10.6	15.0	12.0	7.0
54	11.5	34.0	7.0	162.0
55	7.9	34.0	16.0	6.0
56	0.0	23.0	0.0	165.0
57	4.1	23.0	7.0	0.0
58	---	---	9.0	16.0
59	---	---	---	0.0
60	4.4	0.0	120.0	0.0
61	34.3	5.0	0.0	152.0
62	0.0	0.0	180.0	0.0
63	4.0	20.0	0.0	6.0
64	0.0	0.0	15.0	80.0
65	0.0	20.0	67.0	137.0
66	12.4	55.0	0.0	0.0
96	0.0	543.0	0.0	0.0
97	10.3	23.0	0.0	8.0
98	59.9	13.0	63.0	0.0

TABLE AII.427

WHITE CELLS IN POST-EXERCISE URINE: FLIGHT 4
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
67	1.6	62.0	16.0	0.0
68	0.0	16.0	0.0	---
69	0.0	48.0	0.0	12.0
70	5.3	56.0	284.0	4.0
71	7.5	28.0	0.0	0.0
72	28.9	11.0	194.0	15.0
73	44.0	3.0	---	---
74	14.2	13.0	0.0	8.0
75	220.2	7.0	47.0	12.0
76	8.7	11.0	9.0	0.0
77	26.4	---	---	---
78	0.0	0.0	0.0	10.0

TABLE AII.427 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
79	20.2	9.0	82.0	0.0
80	79.8	4.0	0.0	0.0
81	80.4	19.0	0.0	0.0
82	26.4	48.0	---	17.0
83	17.8	29.0	12.0	0.0
84	7.0	4.0	14.0	16.0
85	0.0	6.0	0.0	17.0
86	269.6	22.0	56.0	155.0
87	102.6	---	---	274.0
88	0.0	---	---	---
99	2646.0	2190.0	5056.0	107.0
100	0.0	0.0	0.0	0.0
101	19.4	20.0	60.0	16.0

TABLE AII.428

EPITHELIAL CELLS IN EXERCISE URINE: FLIGHT 1
(Thousand/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
1	0.0	5.6	0.0	4.0
2	4.8	---	---	0.0
3	0.0	10.0	0.0	0.0
4	18.0	3.0	8.0	10.0
5	0.0	0.0	---	5.0
6	0.0	8.0	0.0	5.0
7	20.6	0.0	9.0	0.0
8	21.4	0.0	5.0	7.0
9	59.0	120.0	38.0	4.0
10	0.0	0.0	4.0	11.0
11	0.0	31.0	0.0	0.0
12	20.8	121.0	41.0	38.0
13	0.0	10.0	---	---
14	0.0	5.0	0.0	7.0
15	0.0	5.0	---	---
16	11.5	107.0	---	---
17	---	64.0	33.0	0.0
18	21.5	22.0	3.0	0.0
19	4.2	3.0	---	---
20	44.0	16.0	---	---
21	45.6	29.0	4.0	17.0
22	28.5	5.0	0.0	0.0
90	34.6	53.0	16.0	187.0
91	27.3	28.0	8.0	0.0
92	66.2	63.0	34.0	0.0

TABLE AII.429

EPITHELIAL CELLS IN EXERCISE URINE: FLIGHT 2
(Thousand/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
23	13.1	28.0	6.0	140.0
24	20.6	10.0	---	---
25	19.0	46.0	3.0	2.0
26	5.0	52.0	0.0	0.0
27	---	68.0	53.0	125.0
28	31.7	18.0	4.0	15.0
29	29.6	10.0	5.0	5.0
30	7.0	7.0	4.0	0.0
31	20.8	---	6.0	69.0
32	11.1	42.0	19.0	---
33	74.6	0.0	34.0	5.0
34	32.2	54.0	5.0	5.0
35	30.9	43.0	4.0	92.0
36	38.6	16.0	10.0	0.0
37	40.6	20.0	15.0	0.0
38	30.6	14.0	37.0	55.0
39	16.6	20.0	---	---
40	---	---	91.0	31.0
41	1.4	---	---	0.0
42	0.0	82.0	0.0	157.0
43	0.0	47.0	5.0	0.0
44	0.0	20.0	6.0	0.0
93	---	---	---	---
94	0.0	22.0	10.0	49.0
95	28.9	0.0	20.0	9.0
102	---	---	---	13.0

TABLE AII.430

EPITHELIAL CELLS IN EXERCISE URINE: FLIGHT 3
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
45	3.6	14.0	7.0	0.0
46	0.0	15.0	2.0	3.0
47	15.3	18.0	13.0	0.0
48	9.0	29.0	---	---
49	4.5	70.0	11.0	38.0
50	9.1	26.0	9.0	4.0
51	3.7	11.0	11.0	0.0
52	7.4	15.0	6.0	0.0
53	6.1	0.0	2.0	5.0
54	6.3	19.0	10.0	70.0
55	0.0	17.0	0.0	4.0

TABLE AII.430 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
56	6.7	0.0	4.0	35.0
57	0.0	28.0	0.0	6.0
58	---	---	0.0	0.0
59	---	---	---	0.0
60	17.8	0.0	4.0	0.0
61	25.3	0.0	11.0	30.0
62	4.2	0.0	67.0	7.0
63	2.5	42.0	0.0	0.0
64	23.0	121.0	0.0	55.0
65	0.0	0.0	6.0	35.0
66	0.0	363.0	7.0	0.0
96	8.2	31.0	0.0	17.0
97	10.3	22.0	7.0	0.0
98	18.2	10.0	12.0	0.0

TABLE AII.431

EPITHELIAL CELLS IN EXERCISE URINE: FLIGHT 4
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
67	3.7	14.0	5.0	3.0
68	4.8	109.0	7.0	---
69	5.0	---	0.0	0.0
70	3.7	60.0	30.0	10.0
71	10.0	14.0	7.0	0.0
72	0.0	0.0	20.0	15.0
73	17.8	34.0	---	---
74	6.3	8.0	8.0	14.0
75	25.7	17.0	63.0	6.0
76	0.0	27.0	0.0	16.0
77	---	---	---	---
78	6.9	0.0	11.0	59.0
79	40.1	0.0	46.0	6.0
80	11.4	4.0	0.0	10.0
81	7.5	54.0	6.0	0.0
82	7.9	3.0	---	33.0
83	18.6	48.0	6.0	6.0
84	5.3	30.0	40.0	0.0
85	0.0	---	8.0	0.0
86	3.9	15.0	7.0	53.0
87	91.6	---	---	168.0
88	0.0	---	---	---
99	2.7	216.0	330.0	126.0
100	12.5	160.0	48.0	8.0
101	38.5	0.0	27.0	35.0

TABLE AII.432

EPITHELIAL CELLS IN POST-EXERCISE URINE: FLIGHT 1
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
1	0.0	12.0	0.0	12.0
2	0.0	---	---	16.0
3	0.0	18.0	---	0.0
4	7.5	27.0	0.0	0.0
5	4.6	0.0	---	0.0
6	0.0	6.0	9.0	0.0
7	135.9	20.0	3.0	0.0
8	0.0	0.0	13.0	20.0
9	0.0	29.0	7.0	---
10	5.7	0.0	0.0	6.0
11	0.0	0.0	11.0	0.0
12	22.6	0.0	53.0	91.0
13	0.0	0.0	---	---
14	0.0	0.0	0.0	0.0
15	0.0	0.0	---	---
16	38.5	29.0	---	---
17	---	0.0	17.0	0.0
18	6.9	28.0	8.0	0.0
19	7.4	14.0	---	---
20	28.9	18.0	---	---
21	7.6	0.0	0.0	0.0
22	0.0	0.0	5.0	0.0
90	0.0	0.0	59.0	111.0
91	0.0	0.0	0.0	0.0
92	0.0	0.0	16.0	0.0

TABLE AII.433

EPITHELIAL CELLS IN POST-EXERCISE URINE: FLIGHT 2
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
23	13.2	69.0	17.0	42.0
24	0.0	49.0	---	---
25	0.0	20.0	0.0	0.0
26	0.0	32.0	0.0	0.0
27	---	24.0	90.0	213.0
28	19.3	0.0	0.0	0.0
29	0.0	11.0	0.0	0.0
30	23.0	0.0	10.0	0.0
31	15.8	---	22.0	256.0
32	20.3	25.0	0.0	3.0
33	16.6	0.0	0.0	0.0
34	8.2	0.0	0.0	0.0

TABLE AII.433 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
35	48.2	24.0	0.0	61.0
36	32.9	0.0	0.0	7.0
37	20.6	0.0	8.0	5.0
38	0.0	0.0	0.0	12.0
39	0.0	0.0	---	---
40	---	---	16.0	0.0
41	24.6	---	---	0.0
42	0.0	0.0	23.0	81.0
43	0.0	0.0	0.0	0.0
44	0.0	31.0	0.0	0.0
93	---	---	---	---
94	7.8	0.0	33.0	0.0
95	90.8	0.0	19.0	7.0
102	---	---	---	0.0

TABLE AII.434

EPITHELIAL CELLS IN POST-EXERCISE URINE: FLIGHT 3
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
45	15.3	24.0	0.0	0.0
46	5.9	35.0	5.0	19.0
47	8.3	10.0	25.0	9.0
48	3.3	58.0	---	---
49	18.6	18.0	13.0	8.0
50	14.8	0.0	14.0	0.0
51	7.1	0.0	0.0	7.0
52	4.9	9.0	0.0	6.0
53	5.3	8.0	12.0	7.0
54	0.0	5.0	0.0	124.0
55	7.9	5.0	8.0	0.0
56	0.0	0.0	0.0	16.0
57	0.0	6.0	0.0	0.0
58	---	---	0.0	0.0
59	---	---	---	0.0
60	4.4	0.0	35.0	0.0
61	25.7	0.0	0.0	46.0
62	0.0	0.0	27.0	0.0
63	0.0	0.0	0.0	0.0
64	0.0	0.0	15.0	80.0
65	0.0	47.0	27.0	0.0
66	6.2	8.0	0.0	0.0
96	13.3	103.0	17.0	0.0
97	5.1	12.0	0.0	8.0
98	11.9	0.0	0.0	18.0

TABLE AII.435

EPITHELIAL CELLS IN POST-EXERCISE URINE: FLIGHT 4
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
67	7.9	107.0	0.0	13.0
68	6.2	5.0	0.0	---
69	0.0	28.0	9.0	12.0
70	5.3	14.0	97.0	4.0
71	7.5	16.0	0.0	0.0
72	0.0	4.0	0.0	15.0
73	18.6	0.0	---	---
74	0.0	0.0	0.0	26.0
75	79.8	0.0	0.0	0.0
76	0.0	44.0	0.0	0.0
77	6.6	---	---	---
78	0.0	0.0	0.0	117.0
79	0.0	31.0	20.0	0.0
80	19.8	0.0	0.0	0.0
81	0.0	6.0	15.0	17.0
82	6.6	5.0	---	17.0
83	8.8	11.0	12.0	0.0
84	0.0	9.0	0.0	80.0
85	0.0	6.0	18.0	17.0
86	17.0	7.0	19.0	71.0
87	20.3	---	---	61.0
88	9.9	---	---	---
99	273.6	64.0	376.0	134.0
100	15.4	0.0	91.0	0.0
101	38.8	0.0	15.0	0.0

TABLE AII.436

RED CELLS IN EXERCISE URINE: FLIGHT 1
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
1	0.0	20.5	0.0	0.0
2	0.0	---	---	0.0
3	0.0	20.0	0.0	0.0
4	0.0	6.0	0.0	0.0
5	0.0	41.0	---	0.0
6	0.0	4.0	0.0	5.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	---
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	40.0	41.0	63.0

TABLE AII.436 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
13	0.0	0.0	---	---
14	0.0	0.0	0.0	0.0
15	0.0	5.0	---	---
16	0.0	0.0	---	---
17	---	0.0	0.0	0.0
18	0.0	2223.0	0.0	0.0
19	0.0	6.0	---	---
20	0.0	36.0	---	---
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
90	0.0	8.0	0.0	0.0
91	0.0	37.0	0.0	0.0
92	0.0	0.0	0.0	0.0

TABLE AII.437

RED CELLS IN EXERCISE URINE: FLIGHT 2
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
23	0.0	84.0	0.0	0.0
24	0.0	20.0	---	---
25	0.0	4.0	0.0	0.0
26	0.0	11.0	0.0	0.0
27	---	61.0	0.0	0.0
28	0.0	7.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	---	0.0	0.0
32	0.0	0.0	0.0	---
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	16.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	---	---
40	---	---	0.0	0.0
41	0.0	---	---	0.0
42	0.0	14.0	0.0	0.0
43	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0
93	---	---	---	---
94	0.0	0.0	0.0	0.0
95	0.0	0.0	0.0	0.0
102	---	---	---	0.0

TABLE AII.438

RED CELLS IN EXERCISE URINE: FLIGHT 3
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
45	0.0	11.0	0.0	0.0
46	0.0	114.0	0.0	0.0
47	0.0	43.0	0.0	0.0
48	0.0	149.0	---	---
49	0.0	47.0	0.0	5.0
50	0.0	19.0	0.0	0.0
51	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0
54	0.0	4.0	0.0	18.0
55	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	106.0
57	0.0	0.0	0.0	0.0
58	---	---	0.0	0.0
59	---	---	---	0.0
60	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0
62	0.0	0.0	95.0	0.0
63	0.0	0.0	0.0	0.0
64	0.0	40.0	0.0	0.0
65	0.0	0.0	0.0	15.0
66	0.0	0.0	0.0	0.0
96	0.0	31.0	0.0	0.0
97	0.0	0.0	0.0	0.0
98	18.2	0.0	0.0	0.0

TABLE AII.439

RED CELLS IN EXERCISE URINE: FLIGHT 4
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
67	0.0	4.0	0.0	0.0
68	0.0	0.0	0.0	---
69	0.0	---	0.0	0.0
70	0.0	26.0	32.0	0.0
71	0.0	4.0	0.0	0.0
72	0.0	0.0	0.0	0.0
73	0.0	141.0	---	---
74	0.0	3.0	0.0	0.0
75	0.0	34.0	0.0	0.0
76	0.0	0.0	0.0	0.0
77	---	---	---	---
78	0.0	0.0	0.0	0.0

TABLE AII.439 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
79	0.0	0.0	0.0	0.0
80	0.0	0.0	0.0	0.0
81	0.0	14.0	0.0	0.0
82	0.0	0.0	---	0.0
83	0.0	24.0	0.0	0.0
84	0.0	55.0	0.0	0.0
85	0.0	---	0.0	0.0
86	0.0	15.0	0.0	0.0
87	0.0	---	---	0.0
88	0.0	---	---	---
99	0.0	1128.0	0.0	0.0
100	0.0	274.0	0.0	0.0
101	0.0	15.0	0.0	0.0

TABLE AII.440

RED CELLS IN POST-EXERCISE URINE: FLIGHT 1
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
1	0.0	0.0	0.0	0.0
2	0.0	---	---	0.0
3	0.0	9.0	---	0.0
4	0.0	7.0	0.0	0.0
5	0.0	0.0	---	0.0
6	0.0	4.0	0.0	0.0
7	0.0	5.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	7.0	---
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	31.0	38.0
13	0.0	0.0	---	---
14	0.0	0.0	0.0	0.0
15	0.0	0.0	---	---
16	0.0	0.0	---	---
17	---	0.0	0.0	0.0
18	0.0	1548.0	0.0	0.0
19	0.0	0.0	---	---
20	0.0	18.0	---	---
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
90	0.0	0.0	0.0	0.0
91	0.0	0.0	0.0	0.0
92	0.0	0.0	0.0	0.0

TABLE AII.441

RED CELLS IN POST-EXERCISE URINE: FLIGHT 2
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
23	0.0	17.0	0.0	0.0
24	0.0	0.0	---	---
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	---	69.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	---	0.0	0.0
32	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	---	---
40	---	---	0.0	0.0
41	0.0	---	---	0.0
42	0.0	0.0	15.0	0.0
43	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0
93	---	---	---	---
94	0.0	0.0	0.0	0.0
95	0.0	0.0	0.0	0.0
102	---	---	---	0.0

TABLE AII.442

RED CELLS IN POST-EXERCISE URINE: FLIGHT 3
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
45	0.0	12.0	0.0	0.0
46	0.0	6.0	0.0	0.0
47	0.0	16.0	0.0	0.0
48	0.0	41.0	---	---
49	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0
51	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0
54	0.0	5.0	0.0	8.0
55	0.0	5.0	0.0	0.0

TABLE AII.442 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
56	0.0	8.0	0.0	37.0
57	0.0	0.0	0.0	0.0
58	---	---	0.0	0.0
59	---	---	---	0.0
60	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0
62	0.0	0.0	55.0	0.0
63	0.0	0.0	0.0	6.0
64	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	5.0
66	0.0	0.0	0.0	0.0
96	0.0	29.0	0.0	0.0
97	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0

TABLE AII.443

RED CELLS IN POST-EXERCISE URINE: FLIGHT 4
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
67	0.0	9.0	0.0	0.0
68	0.0	0.0	0.0	---
69	0.0	16.0	0.0	0.0
70	0.0	5.0	36.0	0.0
71	0.0	8.0	0.0	0.0
72	0.0	0.0	0.0	0.0
73	0.0	0.0	---	---
74	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0
76	0.0	0.0	0.0	0.0
77	0.0	---	---	---
78	0.0	0.0	0.0	0.0
79	0.0	0.0	0.0	0.0
80	0.0	0.0	0.0	0.0
81	0.0	32.0	0.0	0.0
82	0.0	0.0	---	0.0
83	0.0	0.0	0.0	0.0
84	0.0	0.0	0.0	0.0
85	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0
87	0.0	---	---	0.0
88	0.0	---	---	---
99	0.0	0.0	0.0	0.0
100	0.0	0.0	0.0	0.0
101	0.0	0.0	0.0	0.0

TABLE AII.445 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
35	0.0	0.0	0.0	0.0
36	0.0	9.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	---	---
40	---	---	0.0	0.0
41	0.0	---	---	0.0
42	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0
93	---	---	---	---
94	0.0	0.0	0.0	0.0
95	0.0	0.0	0.0	0.0
102	---	---	---	0.0

TABLE AII.446

CASTS IN EXERCISE URINE: FLIGHT 3
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
45	0.0	54.0	0.0	0.0
46	0.0	585.0	0.0	0.0
47	0.0	61.0	0.0	0.0
48	0.0	149.0	---	---
49	0.0	0.0	0.0	0.0
50	0.0	0.0	0.0	0.0
51	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0
54	0.0	4.0	0.0	0.0
55	0.0	0.0	0.0	0.0
56	0.0	0.0	0.0	81.0
57	0.0	0.0	0.0	0.0
58	---	---	0.0	0.0
59	---	---	---	0.0
60	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0
96	0.0	0.0	0.0	0.0
97	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0

TABLE AII.444

CASTS IN EXERCISE URINE: FLIGHT 1
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
1	0.0	16.8	0.0	0.0
2	0.0	---	---	0.0
3	0.0	106.0	0.0	0.0
4	0.0	108.0	0.0	0.0
5	0.0	0.0	---	0.0
6	0.0	4.0	0.0	5.0
7	0.0	0.0	0.0	8.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	8.0	0.0	0.0
12	0.0	0.0	0.0	38.0
13	0.0	0.0	---	---
14	0.0	0.0	0.0	0.0
15	0.0	0.0	---	---
16	0.0	0.0	---	---
17	---	6.0	0.0	0.0
18	0.0	78.0	23.0	0.0
19	0.0	0.0	---	---
20	0.0	0.0	---	---
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
90	0.0	8.0	0.0	7.0
91	0.0	0.0	0.0	0.0
92	0.0	0.0	0.0	0.0

TABLE AII.445

CASTS IN EXERCISE URINE: FLIGHT 2
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
23	0.0	316.0	0.0	0.0
24	0.0	68.0	---	---
25	0.0	12.0	0.0	0.0
26	0.0	37.0	0.0	0.0
27	---	0.0	0.0	0.0
28	0.0	4.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	---	0.0	0.0
32	0.0	0.0	0.0	---
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0

TABLE AII.447

CASTS IN EXERCISE URINE: FLIGHT 4
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
67	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	---
69	0.0	12.0	0.0	0.0
70	0.0	141.0	1163.0	0.0
71	0.0	0.0	0.0	0.0
72	0.0	0.0	26.0	0.0
73	0.0	0.0	---	---
74	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0
76	0.0	0.0	0.0	0.0
77	---	---	---	---
78	0.0	0.0	0.0	0.0
79	0.0	0.0	0.0	0.0
80	0.0	0.0	0.0	0.0
81	0.0	0.0	0.0	0.0
82	0.0	0.0	---	0.0
83	0.0	0.0	0.0	0.0
84	0.0	0.0	0.0	0.0
85	0.0	---	0.0	0.0
86	0.0	0.0	0.0	0.0
87	0.0	---	---	0.0
88	0.0	---	---	---
99	0.0	0.0	0.0	0.0
100	0.0	0.0	0.0	0.0
101	0.0	0.0	0.0	0.0

TABLE AII.448

CASTS IN POST-EXERCISE URINE: FLIGHT 1
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
1	0.0	156.0	0.0	0.0
2	0.0	---	---	0.0
3	0.0	83.0	---	0.0
4	0.0	153.0	0.0	0.0
5	0.0	0.0	---	0.0
6	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	---
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	23.0

TABLE AII.448 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
13	0.0	0.0	---	---
14	0.0	0.0	0.0	0.0
15	0.0	0.0	---	---
16	0.0	0.0	---	---
17	---	0.0	0.0	0.0
18	0.0	52.0	44.0	0.0
19	0.0	0.0	---	---
20	0.0	0.0	---	---
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
90	0.0	0.0	0.0	0.0
91	0.0	0.0	0.0	0.0
92	0.0	0.0	0.0	0.0

TABLE AII.449

CASTS IN POST-EXERCISE URINE: FLIGHT 2
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
23	0.0	418.0	0.0	0.0
24	0.0	21.0	---	---
25	0.0	47.0	0.0	0.0
26	0.0	4.0	0.0	0.0
27	---	3.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	8.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	---	0.0	0.0
32	0.0	0.0	0.0	0.0
33	0.0	0.0	0.0	0.0
34	0.0	0.0	0.0	0.0
35	0.0	0.0	0.0	0.0
36	0.0	7.0	0.0	0.0
37	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0
39	0.0	0.0	---	---
40	---	---	0.0	0.0
41	0.0	---	---	0.0
42	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0
93	---	---	---	---
94	0.0	0.0	0.0	0.0
95	0.0	0.0	0.0	0.0
102	---	---	---	0.0

TABLE AII.450

CASTS IN POST-EXERCISE URINE: FLIGHT 3
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
45	0.0	31.0	0.0	0.0
46	0.0	569.0	0.0	0.0
47	0.0	88.0	0.0	0.0
48	0.0	446.0	---	---
49	0.0	0.0	0.0	0.0
50	0.0	0.0	9.0	0.0
51	0.0	0.0	0.0	0.0
52	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0
54	0.0	0.0	0.0	0.0
55	0.0	0.0	3.0	0.0
56	0.0	0.0	0.0	53.0
57	0.0	0.0	0.0	0.0
58	---	---	0.0	0.0
59	---	---	---	0.0
60	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0
62	0.0	0.0	0.0	0.0
63	0.0	0.0	0.0	0.0
64	0.0	0.0	0.0	0.0
65	0.0	0.0	0.0	0.0
66	0.0	0.0	0.0	0.0
96	0.0	0.0	0.0	0.0
97	0.0	0.0	0.0	0.0
98	0.0	0.0	0.0	0.0

TABLE AII.451

CASTS IN POST-EXERCISE URINE: FLIGHT 4
(Thousands/2hr)

Subject Code No.	P II	EXP I	REC I	REC II
67	0.0	0.0	0.0	0.0
68	0.0	0.0	0.0	---
69	0.0	12.0	0.0	0.0
70	0.0	47.0	2300.0	0.0
71	0.0	0.0	0.0	0.0
72	0.0	0.0	90.0	0.0
73	0.0	0.0	---	---
74	0.0	0.0	0.0	0.0
75	0.0	0.0	0.0	0.0
76	0.0	0.0	0.0	0.0
77	0.0	---	---	---
78	0.0	0.0	0.0	0.0

TABLE AII.451 (Contd)

Subject Code No.	P II	EXP I	REC I	REC II
79	0.0	0.0	0.0	0.0
80	0.0	0.0	0.0	0.0
81	0.0	0.0	0.0	0.0
82	0.0	0.0	---	0.0
83	0.0	0.0	0.0	0.0
84	0.0	0.0	0.0	0.0
85	0.0	0.0	0.0	0.0
86	0.0	0.0	0.0	0.0
87	0.0	---	---	0.0
88	0.0	---	---	---
99	0.0	0.0	0.0	0.0
100	0.0	0.0	0.0	0.0
101	0.0	0.0	0.0	0.0

TABLE AII.452

MINUTE URINARY CREATININE EXCRETION IN EXERCISE:
FLIGHT 1
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	0.89	1.21	0.80	1.28	1.31
2	1.73	1.37	----	----	2.80
3	1.09	0.96	0.89	1.11	4.06
4	1.35	1.47	1.16	1.48	1.63
5	1.64	1.05	0.92	----	1.21
6	2.48	1.07	1.20	1.38	1.37
7	4.24	1.60	1.68	1.61	1.74
8	1.94	1.22	0.65	1.41	1.56
9	1.05	1.59	2.01	1.40	1.52
10	2.10	1.25	----	1.41	1.33
11	1.29	1.27	2.28	1.65	1.32
12	1.72	0.64	2.57	1.30	1.60
13	1.68	1.35	1.03	----	----
14	1.64	1.53	1.30	1.59	1.66
15	1.59	1.44	1.18	----	----
16	1.28	0.94	1.20	----	----
17	1.53	(1.24)	1.31	1.08	4.68
18	1.36	1.10	1.05	1.15	1.52
19	1.28	1.15	1.20	----	----
20	1.47	1.34	1.73	----	----
21	1.48	1.31	2.05	1.16	1.14
22	1.63	1.17	1.62	1.37	1.42
90	1.45	1.61	1.96	1.76	1.70
91	1.49	1.66	1.59	1.88	1.33
92	1.09	1.33	1.83	1.52	1.20

TABLE AII.453

MINUTE URINARY CREATININE EXCRETION IN EXERCISE:
FLIGHT 2
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	1.62	1.59	1.47	2.35	4.02
24	0.91	0.97	0.52	----	----
25	1.46	1.53	0.91	1.25	0.88
26	1.54	1.23	0.76	1.07	1.38
27	1.58	(1.32)	0.76	1.39	1.55
28	1.49	1.38	1.03	1.35	1.51
29	1.74	0.95	0.90	1.58	1.71
30	(1.57)	1.00	0.95	1.55	1.37
31	1.64	1.58	----	2.16	1.89
32	1.89	1.18	2.05	1.36	----
33	2.56	1.71	2.89	1.91	1.52
34	1.58	1.24	2.87	1.51	1.48
35	1.47	1.07	1.16	1.45	1.42
36	1.44	1.37	0.71	1.62	1.54
37	1.64	1.31	1.11	1.63	1.98
38	1.95	1.59	1.29	1.68	1.53
39	1.42	1.51	1.28	----	----
40	1.06	(1.32)	----	2.15	1.77
41	1.31	1.16	----	----	1.46
42	1.52	1.35	1.71	1.50	1.89
43	1.37	1.41	1.93	1.72	1.52
44	1.77	1.30	1.90	1.86	1.91
93	1.64	----	----	----	----
94	1.73	2.05	1.00	1.86	3.12
95	1.45	1.47	0.90	1.38	1.68
102	----	----	----	----	1.83

TABLE AII.454

MINUTE URINARY CREATININE EXCRETION IN EXERCISE:
FLIGHT 3
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	1.45	1.18	0.66	1.06	1.16
46	1.22	1.08	0.69	0.86	1.29
47	1.54	1.46	0.96	0.87	1.21
48	2.19	1.22	0.80	----	----
49	1.26	1.46	0.53	1.15	1.37
50	1.24	1.14	0.78	0.40	1.17
51	(1.52)	0.87	0.86	1.24	1.17
52	1.48	1.48	1.26	1.34	1.29
53	1.17	1.16	0.89	0.89	1.06

TABLE AII.454 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
54	1.61	1.61	0.94	0.83	1.67
55	0.98	1.29	2.13	1.21	1.33
56	1.12	1.17	1.48	1.07	1.35
57	1.24	1.59	0.58	1.04	1.60
58	1.61	(1.45)	----	1.22	1.18
59	(1.52)	(1.45)	----	----	0.89
60	1.34	1.22	0.96	1.20	1.25
61	1.65	1.82	1.27	1.12	1.62
62	1.44	1.25	0.62	1.11	1.48
63	1.39	1.23	1.73	1.10	1.61
64	2.64	3.56	3.32	1.30	1.76
65	2.22	1.38	2.03	1.26	1.56
66	1.62	1.92	2.22	1.32	1.79
96	1.52	2.14	2.69	1.88	2.33
97	1.36	1.10	2.38	1.60	1.45
98	1.30	1.47	1.70	0.96	0.33

TABLE AII.455

MINUTE URINARY CREATININE EXCRETION IN EXERCISE:
FLIGHT 4
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	1.08	1.18	0.61	0.97	1.09
68	1.65	1.59	1.44	1.23	----
69	1.65	1.48	----	1.29	1.82
70	1.60	1.41	1.07	0.53	0.96
71	1.60	1.48	1.11	1.19	1.52
72	1.74	1.72	1.31	1.13	1.74
73	1.33	1.18	1.21	----	----
74	0.22	1.44	1.15	1.54	1.40
75	1.18	1.70	2.20	1.26	1.69
76	1.38	1.03	1.84	1.13	1.12
77	1.41	1.58	----	----	----
78	0.92	1.66	2.01	1.62	1.41
79	1.64	1.90	1.19	1.63	1.44
80	1.80	1.70	1.01	1.40	1.09
81	1.63	1.83	0.70	1.47	2.06
82	(1.40)	1.40	1.09	----	1.44
83	1.27	1.79	1.52	1.32	1.52
84	1.44	1.56	1.35	1.14	1.70
85	1.52	1.86	----	1.23	5.10
86	1.38	1.51	1.67	1.30	1.43
87	1.58	2.18	----	----	1.39
88	1.49	1.60	----	----	----
99	1.22	1.98	2.06	1.45	0.36
100	1.86	2.18	2.93	2.02	2.23
101	1.40	1.53	1.79	2.59	1.49

TABLE AII.457 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
34	0.26	0.07	1.46	0.00	0.00
35	0.28	0.00	0.20	0.10	0.00
36	0.49	0.11	0.21	0.11	0.00
37	0.24	0.18	0.17	0.05	0.07
38	0.44	0.24	0.32	0.00	0.10
39	0.59	0.40	0.47	----	----
40	0.61	(0.16)	----	0.34	0.00
41	0.62	0.30	----	----	0.16
42	0.14	0.48	0.38	0.14	0.20
43	0.18	0.26	0.44	0.02	0.23
44	0.24	0.45	0.75	0.00	0.00
93	0.29	----	----	----	----
94	0.53	0.24	0.19	0.00	0.53
95	0.40	0.15	0.09	0.11	0.00
102	----	----	----	----	0.46

TABLE AII.458

MINUTE URINARY CREATINE EXCRETION IN EXERCISE:
FLIGHT 3
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	0.08	0.27	0.20	0.00	0.11
46	0.17	0.22	0.14	0.03	0.13
47	0.07	0.31	0.19	0.00	0.15
48	0.62	0.25	0.20	----	----
49	0.07	0.22	0.30	0.00	0.00
50	0.10	0.23	0.38	0.00	0.12
51	(0.18)	0.08	0.21	0.00	0.21
52	0.00	0.25	0.50	0.00	0.11
53	0.12	0.23	0.82	0.07	0.18
54	0.25	0.39	0.27	0.00	0.31
55	0.10	0.22	0.86	0.00	0.14
56	0.00	0.21	0.23	0.09	0.35
57	0.10	0.16	0.43	0.07	0.32
58	0.25	(0.21)	----	0.05	0.41
59	(0.18)	(0.21)	----	----	0.13
60	0.11	0.15	0.33	0.04	0.15
61	0.10	0.16	0.46	0.00	0.18
62	0.28	0.07	0.44	0.00	0.00
63	0.14	0.11	0.53	0.00	0.02
64	0.37	0.40	0.00	0.00	0.05
65	0.52	0.09	0.20	0.00	0.13
66	0.25	0.18	0.20	0.00	0.09
96	0.43	0.00	0.18	0.00	0.00
97	0.37	0.10	0.05	0.06	0.00
98	0.51	0.00	0.09	0.00	0.00

TABLE AII.456

MINUTE URINARY CREATINE EXCRETION IN EXERCISE:
FLIGHT 1
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	0.61	0.10	0.15	0.03	0.87
2	0.26	0.04	----	----	0.07
3	0.42	0.07	0.13	0.46	0.56
4	0.47	0.30	0.21	0.05	0.12
5	0.16	0.17	0.48	----	0.16
6	0.53	0.18	0.16	0.00	0.17
7	0.43	0.13	0.00	0.00	0.00
8	0.33	0.06	0.00	0.00	0.19
9	0.24	0.06	1.18	0.00	0.14
10	0.21	0.10	----	0.14	0.08
11	0.33	0.04	1.44	0.00	0.19
12	0.15	0.05	0.88	0.05	0.16
13	0.72	0.24	0.30	----	----
14	0.46	0.31	0.15	0.00	0.09
15	0.29	0.04	0.12	----	----
16	0.43	0.12	0.47	----	----
17	0.25	(0.12)	0.20	0.15	0.54
18	0.31	0.12	0.12	0.04	0.14
19	0.26	0.19	0.17	----	----
20	0.21	0.00	0.18	----	----
21	0.66	0.11	0.31	0.02	0.11
22	0.36	0.15	0.16	0.04	0.09
90	0.27	0.11	0.26	0.33	0.19
91	0.31	0.08	0.04	0.74	0.27
92	0.44	0.07	0.00	0.19	0.00

TABLE AII.457

MINUTE URINARY CREATINE EXCRETION IN EXERCISE:
FLIGHT 2
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	0.10	0.08	0.35	0.13	0.15
24	0.21	0.00	0.35	----	----
25	0.35	0.00	0.54	0.00	0.00
26	0.26	0.13	0.57	0.00	0.20
27	0.45	(0.16)	0.14	0.00	0.32
28	0.26	0.10	0.30	0.00	0.02
29	0.29	0.00	0.12	0.04	0.10
30	(0.36)	0.12	0.20	0.00	0.02
31	0.34	0.09	----	0.13	0.00
32	0.17	0.07	0.59	0.00	----
33	1.02	0.16	1.70	0.00	0.06

TABLE AII.459

MINUTE URINARY CREATINE EXCRETION IN EXERCISE:
FLIGHT 4
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	0.10	0.16	0.14	0.00	0.00
68	0.15	0.13	0.04	0.00	----
69	0.17	0.44	----	0.24	0.14
70	0.10	0.16	0.22	0.00	0.08
71	0.15	0.16	0.16	0.12	0.22
72	0.17	0.07	0.15	0.14	0.00
73	0.20	0.16	0.44	----	----
74	0.03	0.20	0.15	0.07	0.08
75	0.06	0.11	0.47	0.28	0.11
76	0.23	0.08	0.78	0.00	0.04
77	0.19	0.25	----	----	----
78	0.09	0.24	0.07	0.10	0.13
79	0.05	0.09	0.09	0.00	0.22
80	0.28	0.30	0.18	0.00	0.07
81	0.42	0.13	0.12	0.28	0.00
82	(0.25)	0.26	0.19	----	0.12
83	0.64	0.29	0.38	0.36	0.18
84	0.43	0.18	0.38	0.48	0.28
85	0.43	0.00	----	0.14	0.37
86	0.35	0.20	0.27	0.34	1.71
87	0.61	0.02	----	----	0.24
88	0.43	0.21	----	----	----
99	0.31	0.16	0.14	0.00	0.06
100	0.33	0.11	0.00	0.00	0.00
101	0.76	0.19	0.51	0.00	0.00

TABLE AII.460

MINUTE URINARY UREA NITROGEN EXCRETION
IN EXERCISE: FLIGHT 1
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	7.0	4.6	3.4	5.2	3.1
2	8.9	7.1	---	---	2.4
3	9.9	2.6	4.6	4.8	17.9
4	7.2	6.8	5.2	6.4	7.0
5	8.9	3.6	5.5	---	9.0
6	15.8	8.3	5.9	7.7	8.1
7	39.0	10.4	14.5	9.0	8.0
8	17.2	7.0	7.3	5.2	8.5
9	6.3	5.5	12.2	5.7	10.5
10	6.6	4.5	---	5.8	5.3
11	7.6	5.5	14.3	11.4	9.9

TABLE AII.460 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
12	5.6	4.1	27.5	3.7	7.3
13	8.1	6.9	5.3	---	---
14	11.4	12.2	6.2	8.7	11.9
15	9.8	7.1	5.8	---	---
16	6.4	6.4	7.0	---	---
17	5.5	(6.6)	2.5	3.4	36.1
18	7.1	6.5	5.5	3.3	7.1
19	7.3	5.2	4.3	---	---
20	7.7	7.0	7.1	---	---
21	7.6	7.1	11.0	4.7	7.7
22	9.3	10.6	6.4	5.8	6.7
90	13.5	6.9	9.1	6.5	10.7
91	11.7	14.6	10.8	8.6	6.3
92	13.3	8.2	10.8	8.2	12.1

TABLE AII.461

MINUTE URINARY UREA NITROGEN EXCRETION
IN EXERCISE: FLIGHT 2
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	11.4	7.7	6.1	9.1	17.0
24	14.4	6.3	3.3	---	---
25	11.1	8.2	5.8	5.0	2.3
26	9.2	6.9	5.8	5.8	5.0
27	12.3	(9.2)	3.4	12.0	11.4
28	9.2	10.8	6.0	8.0	7.8
29	10.6	6.4	3.5	2.6	7.6
30	(11.5)	7.5	3.0	5.2	6.4
31	8.8	12.0	---	8.1	12.0
32	12.1	7.6	10.0	5.7	---
33	17.4	13.6	20.7	7.3	7.7
34	9.6	9.5	22.7	6.3	5.3
35	7.6	6.9	7.3	6.1	5.8
36	7.7	6.7	4.2	5.9	10.4
37	8.6	6.9	6.7	4.9	11.3
38	14.0	13.5	8.8	7.8	12.1
39	16.9	12.0	8.2	---	---
40	17.9	(9.2)	---	9.0	18.9
41	11.4	7.9	---	---	10.0
42	12.5	7.8	14.2	4.9	11.3
43	7.8	8.1	12.2	6.3	8.0
44	10.8	10.4	14.2	7.9	18.3
93	10.6	---	---	---	---
94	16.6	20.0	7.5	10.2	16.2
95	9.0	9.0	7.7	6.1	9.1
102	---	---	---	---	11.1

TABLE AII.462

MINUTE URINARY UREA NITROGEN EXCRETION
IN EXERCISE: FLIGHT 3
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	5.8	5.4	5.3	4.6	7.8
46	5.5	3.2	2.7	1.0	4.2
47	6.3	5.5	2.5	1.4	3.0
48	12.0	4.1	1.8	---	---
49	8.4	7.5	6.3	1.5	7.5
50	5.4	5.8	2.2	1.0	5.6
51	(7.2)	2.9	0.6	3.7	5.8
52	6.2	6.4	2.2	6.3	4.9
53	5.6	5.8	7.8	3.6	7.2
54	5.9	8.7	4.9	2.9	8.4
55	3.7	6.0	8.3	5.6	8.4
56	4.1	7.8	9.4	4.7	5.3
57	4.4	5.5	6.6	4.0	8.9
58	6.1	(6.2)	---	3.4	6.3
59	(7.2)	(6.2)	---	---	4.5
60	5.1	3.8	3.3	3.6	3.0
61	7.4	10.6	7.1	8.6	6.3
62	12.3	6.2	7.8	5.0	7.2
63	5.2	2.5	1.9	4.1	3.9
64	9.8	12.2	8.5	3.3	4.3
65	17.4	5.4	7.9	7.9	9.9
66	7.3	9.0	7.4	9.1	11.6
96	10.5	15.4	14.6	11.0	15.9
97	9.1	5.1	11.3	6.0	7.8
98	6.8	7.5	10.4	10.0	15.9

TABLE AII.463

MINUTE URINARY UREA NITROGEN EXCRETION
IN EXERCISE: FLIGHT 4
(mg/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	3.1	3.1	3.5	8.0	4.1
68	9.4	4.9	8.8	11.5	---
69	9.3	7.2	---	6.0	9.3
70	7.1	7.3	5.2	1.6	2.3
71	7.4	4.0	5.0	8.1	9.6
72	7.9	9.8	5.1	6.4	10.3
73	5.6	4.0	4.8	---	---
74	1.6	11.4	2.0	7.9	6.5
75	5.7	6.7	11.6	8.4	7.5
76	6.9	4.5	11.5	4.7	4.5
77	10.2	10.0	---	---	---

TABLE AII.463 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
78	5.6	11.6	8.2	10.5	7.7
79	9.7	13.1	4.9	12.6	8.7
80	10.4	8.9	3.4	8.0	4.5
81	13.5	12.0	4.4	7.0	16.3
82	(8.4)	6.3	4.4	---	10.6
83	11.1	8.3	6.5	7.8	8.5
84	11.9	7.4	6.8	8.9	9.8
85	9.3	6.7	---	8.3	18.7
86	6.8	4.8	6.4	7.8	5.0
87	14.4	8.6	---	---	5.6
88	11.0	6.8	---	---	---
99	5.5	8.4	8.9	4.5	2.2
100	20.6	17.3	17.5	10.7	12.0
101	15.8	13.6	11.3	16.0	10.9

TABLE AII.464

MINUTE URINARY OSMOLAR EXCRETION
IN EXERCISE: FLIGHT 1
(mOsm/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	431	288	149	504	334
2	468	421	---	---	1266
3	438	144	205	286	734
4	462	381	242	305	326
5	504	255	257	---	429
6	939	396	261	415	402
7	2195	663	760	484	476
8	715	402	114	272	426
9	345	536	704	369	398
10	466	251	---	339	228
11	372	273	550	441	431
12	412	312	785	288	436
13	517	393	263	---	---
14	514	438	329	434	474
15	466	303	295	---	---
16	435	264	389	---	---
17	409	(360)	225	225	2066
18	410	280	228	215	355
19	376	339	230	---	---
20	484	302	355	---	---
21	519	387	495	220	380
22	635	536	325	298	358
90	516	389	638	457	643
91	588	698	689	722	415
92	694	490	741	722	819

TABLE AII.465

MINUTE URINARY OSMOLAR EXCRETION
IN EXERCISE: FLIGHT 2
(mOsm/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	478	325	353	466	867
24	603	371	187	---	---
25	789	450	304	274	136
26	519	361	297	238	236
27	844	(485)	181	625	547
28	507	600	262	314	344
29	603	355	149	339	362
30	(666)	419	143	296	347
31	601	799	---	599	681
32	592	348	588	305	---
33	1092	604	820	381	256
34	503	404	875	334	315
35	524	343	302	362	315
36	563	478	167	323	416
37	498	347	327	359	540
38	857	612	363	458	613
39	758	638	352	---	---
40	779	(485)	---	659	1043
41	804	336	---	---	534
42	573	372	511	326	526
43	512	476	523	407	374
44	976	502	623	596	694
93	848	---	---	---	---
94	952	1162	496	647	1476
95	511	402	352	335	588
102	---	---	---	---	802

TABLE AII.466

MINUTE URINARY OSMOLAR EXCRETION
IN EXERCISE: FLIGHT 3
(mOsm/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	411	308	245	292	318
46	271	131	143	98	203
47	359	289	193	131	222
48	696	203	176	---	---
49	476	314	327	134	373
50	375	261	250	69	302
51	(439)	157	147	300	299
52	312	295	266	393	264
53	328	256	694	230	360
54	459	324	267	186	439

TABLE AII.466 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
55	200	262	526	275	352
56	259	330	382	293	293
57	315	294	303	251	441
58	397	(331)	---	271	441
59	(439)	(331)	---	---	299
60	361	214	256	218	199
61	568	666	517	506	494
62	670	358	438	312	428
63	279	153	609	304	265
64	539	936	507	187	222
65	1058	419	600	481	493
66	443	443	380	576	465
96	361	751	805	838	1177
97	558	271	739	491	574
98	390	349	500	643	364

TABLE AII.467

MINUTE URINARY OSMOLAR EXCRETION
IN EXERCISE: FLIGHT 4
(mOsm/min)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	278	296	256	290	204
68	663	484	434	549	---
69	552	446	---	366	505
70	392	328	264	75	133
71	564	381	233	447	459
72	669	582	212	443	541
73	241	212	217	---	---
74	65	427	126	470	341
75	329	333	518	579	496
76	401	210	465	313	288
77	574	(412)	---	---	---
78	423	600	653	701	456
79	585	526	241	783	416
80	690	442	220	470	224
81	667	466	297	370	720
82	(519)	340	227	---	694
83	784	448	342	477	452
84	717	423	291	505	588
85	548	341	---	551	1147
86	327	261	338	497	327
87	825	657	---	---	422
88	609	453	---	---	---
99	353	481	619	362	227
100	1210	893	1170	828	1238
101	1379	752	930	1236	725

TABLE AII.468

CALORIE BALANCE: FLIGHT 1
(Cal/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	-220	-525	-3170	-2800	-160	+1170
2	-255	-275	----	----	----	----
3	+960	+770	-2910	----	+690	+2210
4	+170	-75	-3620	----	+15	+1645
5	+290	-390	-1840	-1740	----	----
6	+900	+330	-2390	-2220	-100	+1975
7	+620	+675	-1580	-1420	+180	+1770
8	+485	+475	-1470	-1045	+300	+1670
9	+675	+210	-3035	-2875	-645	+1735
10	-75	+210	-2115	-1995	+45	+2075
11	+885	+610	-1525	-1395	+110	+1825
12	-35	-600	-1855	-1715	-35	+1860
13	+400	+320	-2290	----	----	----
14	+565	+595	-2260	-2140	-105	+2875
15	+775	-70	-1675	-1595	+65	----
16	+935	+465	-1165	----	----	----
17	-460	-2720	-3315	-3165	-1015	+315
18	+420	+180	-2100	-1830	+185	+2580
19	+360	+165	-935	-855	+535	+805
20	+365	+245	-1055	----	----	----
21	-140	-125	-75	-45	+315	+1035
22	+650	+170	-225	-135	+265	+1200
90	----	+1415	----	+1665	-535	-690
91	----	+860	----	+400	+1305	+810
92	----	+1285	----	-90	+550	+1025

TABLE AII.469

CALORIE BALANCE: FLIGHT 2
(Cal/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	-555	-845	-3740	-3400	-590	+1515
24	+505	+390	-2510	-2270	+560	----
25	+120	-360	-3220	-2920	+10	+2640
26	+1215	+615	-2580	-2360	+495	+2855
27	+1120	+875	-1580	-1465	+490	+2415
28	+760	+395	-2190	-1940	-85	+2365
29	+425	+5	-1685	-1405	+50	+1960
30	----	-145	-1220	-1150	+310	+1000
31	-555	-665	-2895	----	----	----
32	+525	+350	-2025	-1835	+25	+1375
33	+435	-90	-785	-955	+345	+1775
34	+215	-210	-935	-795	+460	+680

TABLE AII.469 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	+825	+145	-2030	-1850	+115	+1590
36	+345	+140	-2080	-1900	-50	+2080
37	+375	+275	-1135	-965	+380	+1315
38	-10	+5	-1305	-1135	-140	+1930
39	-345	+120	-1985	----	----	----
40	+485	-135	----	----	----	----
41	+650	+280	----	----	----	----
42	+605	+500	-1255	-1085	+355	+2200
43	-160	+275	-155	-35	+440	+1390
44	+1390	+1100	-255	-45	+170	+1820
93	----	----	----	----	----	----
94	----	-130	----	-800	-100	+510
95	----	-745	----	-1525	-1270	-720
102	----	----	----	+305	-15	+420

TABLE AII.470

CALORIE BALANCE: FLIGHT 3
(Cal/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	+775	+695	-2840	-2780	+50	+2245
46	+560	-1495	-3190	-3130	-270	+2575
47	+160	-175	-3060	-3000	-195	+795
48	+410	+615	-3380	-3290	-450	+2300
49	+1250	+870	-1820	-2125	+120	+2335
50	+895	+285	-1685	-1645	+215	+1810
51	+115	-1085	-1465	-1455	-225	+1020
52	+540	+445	-1105	----	+210	+1735
53	-150	+35	-1865	-1835	-20	+405
54	+120	+285	-2870	-2800	+135	+2380
55	+190	+1015	-565	-545	+665	+1745
56	+640	+765	-995	-985	+410	+2890
57	-60	+340	-2190	-2170	-270	+2005
58	-665	-1735	----	----	----	----
59	----	----	-1065	-1075	+235	+1580
60	-1080	-1090	-1515	-1535	-265	+590
61	+410	+300	-2095	-2085	-150	+1625
62	+835	+890	-2155	-2135	-200	----
63	+275	+340	-1345	-1365	+40	+2500
64	+1020	+605	-1505	-1515	-115	+1900
65	+2255	+1910	-455	-465	-65	+2380
66	+1350	+1040	-415	-445	-5	+1495
96	----	+905	----	-115	-1800	+2170
97	----	-150	----	-1605	-1015	-1250
98	----	+555	----	+85	-1195	-75

TABLE AII.471

CALORIE BALANCE: FLIGHT 4
(Cal/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	+825	+365	-2660	-2600	+75	+2290
68	+625	+5	-2930	----	+490	+1785
69	+575	+60	-2910	-2870	+15	+2360
70	+1270	+795	-2910	----	+510	+2320
71	+795	+300	-1790	-1780	+150	+2930
72	+160	+95	-2060	-2060	-185	+2345
73	+520	+135	-690	-695	----	----
74	+300	-1335	-1100	-1105	+250	+2080
75	+175	-195	-2075	-2095	-300	+1460
76	+430	+225	-1475	-1485	+125	+2105
77	-255	-125	----	----	----	----
78	+165	+345	-1065	-1155	+290	+2010
79	+665	-210	-1920	-1900	+115	+1760
80	+750	+275	-1780	-1700	+215	+2040
81	+270	+235	-1005	-1095	+195	+1420
82	+1055	+50	-810	----	----	----
83	+445	+210	-1885	-1885	+245	+2045
84	+575	+285	-1815	-1805	+150	+2000
85	+370	-185	-1015	-1105	+310	+1455
86	+205	+405	-765	-815	+650	+1405
87	+105	-290	+290	----	----	----
88	+500	+525	+960	----	----	----
99	----	+435	----	-485	-325	-740
100	----	-1330	----	-1250	-1145	-255
101	----	+685	----	-420	+1235	+1190

TABLE AII.472

WATER BALANCE: FLIGHT 1
(L/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	+0.39	-0.27	-1.38	-2.22	-0.35	+0.02
2	-0.50	-0.47	----	----	----	----
3	+0.00	-0.41	-1.60	----	-0.53	-0.26
4	-0.18	+0.20	-0.32	----	-0.36	+0.13
5	+0.07	-0.15	-0.77	----	----	----
6	+0.40	+0.11	-1.74	-2.02	-0.08	+0.19
7	+0.12	-0.15	-1.23	-0.87	-0.20	-0.26
8	+0.25	-0.60	+0.08	-0.82	-0.05	+1.06
9	+1.21	+0.01	-1.33	-1.97	+0.03	+0.48
10	-0.01	-0.09	-0.93	-1.21	+0.70	+0.81
11	-0.26	+0.31	-0.19	-0.30	+0.41	+0.67
12	+0.10	-0.20	-1.20	-0.53	+2.11	+0.72

TABLE AII.472 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	+0.63	-0.29	-0.96	----	----	----
14	+0.06	-0.29	-1.50	-0.66	+1.03	+1.16
15	0.00	+0.07	-2.07	-0.62	----	----
16	+0.31	-0.47	-1.03	----	----	----
17	+0.05	----	-0.60	-0.20	+1.04	+1.18
18	+0.20	-0.43	-1.88	-1.83	+0.54	+0.07
19	+0.09	-0.06	-0.80	-0.38	+1.84	+1.42
20	+0.54	-0.51	-0.99	----	----	----
21	+0.10	-0.28	-0.65	-0.41	+0.80	+0.71
22	+0.03	-0.06	-0.78	-1.48	+1.45	+1.06
90	----	-0.02	----	+1.09	-0.07	+0.90
91	----	+0.02	----	-0.20	+2.22	+0.51
92	----	+0.02	----	-1.72	-0.56	+1.97

TABLE AII.473

WATER BALANCE: FLIGHT 2
(L/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	+0.26	-1.00	-2.03	-1.54	+0.41	+0.74
24	-0.22	-0.37	-2.26	-2.01	+0.56	----
25	-0.16	+0.19	-1.20	-1.37	+0.85	+1.55
26	+0.21	-0.26	-1.35	-2.15	+0.04	+0.53
27	+0.78	-0.46	-0.82	-0.89	+0.66	+1.89
28	+0.27	-0.34	-1.56	-0.91	-0.15	+1.21
29	+0.27	-0.42	-1.49	-0.46	+0.77	+0.45
30	----	-0.25	-1.32	-0.84	+0.91	+0.34
31	+0.23	-0.32	-3.38	----	+0.39	-1.83
32	+0.15	-0.22	-0.58	-0.24	+0.59	+1.13
33	+0.20	-0.30	-1.51	-0.79	+1.02	+1.37
34	+0.03	+0.02	-1.80	-1.23	+0.99	-0.01
35	+0.12	-0.15	-0.63	-0.33	+0.33	-0.02
36	+0.18	-0.30	-1.33	-0.88	+0.20	+0.46
37	+0.18	-0.26	-0.94	+0.10	+0.19	+0.90
38	+0.36	-0.45	-1.65	-0.56	0.00	+0.44
39	+0.57	-0.79	-1.43	----	----	----
40	+0.47	-1.69	----	-0.07	+0.22	-1.58
41	+0.83	-0.88	----	----	----	----
42	+0.36	-0.39	-1.84	-0.84	+0.93	+0.53
43	+0.20	-0.45	-1.21	-0.64	+0.66	+1.00
44	+0.45	-0.26	-0.78	-0.70	+0.55	+1.16
93	----	----	----	----	----	----
94	----	+0.03	----	-0.58	+1.83	+1.31
95	----	+0.02	----	-1.17	-1.11	+1.62
102	----	----	----	-1.10	-0.60	+2.06

TABLE AII.474

WATER BALANCE: FLIGHT 3
(L/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	+0.12	-0.09	-1.11	-1.77	-0.29	0.00
46	+0.13	-0.19	-0.50	-0.94	+0.57	+0.49
47	+0.05	0.00	-1.30	-1.35	+1.20	-0.38
48	-0.17	+0.29	-1.43	-1.09	+0.92	+0.41
49	+0.11	-0.15	-1.62	-1.79	+0.79	-0.16
50	+0.30	-0.24	-1.01	-1.78	-0.24	+0.30
51	+0.37	-0.27	-0.37	-0.40	+0.56	+0.95
52	-0.08	+0.12	-1.30	-1.30	-0.72	-0.22
53	-0.01	+0.01	-0.49	-0.25	+0.71	-0.11
54	+0.27	-0.33	-1.38	-1.33	+0.80	+0.61
55	-0.02	-0.01	-0.04	-0.15	+0.65	+0.84
56	-0.34	+0.30	-1.77	-1.64	+0.40	+0.68
57	-0.06	+0.07	-0.68	-1.12	-0.02	+0.33
58	+0.23	-0.87	----	----	-0.44	-1.06
59	----	----	-0.88	-0.72	+0.52	+0.25
60	+0.04	-0.06	-0.82	-1.42	+0.57	+0.19
61	+0.03	-0.18	-0.74	-0.85	-0.22	+0.49
62	+0.20	-0.26	-0.20	-0.50	+0.45	-0.85
63	+0.02	+0.02	-0.84	-0.88	+0.25	+0.86
64	-0.01	+0.07	+0.09	-1.09	+0.14	-0.12
65	+0.11	-0.15	-0.48	-0.95	-0.74	+0.16
66	-0.27	+0.52	-0.90	-1.03	+0.08	+0.14
96	----	-0.03	----	+1.02	-2.03	+3.30
97	----	-0.03	----	-0.74	-0.44	+2.71
98	----	+0.03	----	+1.12	+0.47	+4.49

TABLE AII.475

WATER BALANCE: FLIGHT 4
(L/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	0.00	+0.01	-1.33	-1.14	+1.48	+0.10
68	+0.69	+0.01	-1.50	----	+0.01	+1.31
69	+1.00	-0.12	-1.44	-1.46	+0.15	+0.75
70	+1.32	-0.18	-1.73	----	-0.47	-0.46
71	+0.02	-0.02	-1.56	-1.15	+0.40	+0.54
72	-0.88	+0.60	-1.53	-1.12	-0.11	-0.19
73	-0.50	+0.26	-0.97	-0.30	----	----
74	-1.23	+0.52	-2.01	-2.10	+0.93	+0.17
75	-0.50	+0.31	-1.69	-0.80	-0.08	-1.09
76	-1.65	+0.16	-1.20	-0.86	-0.08	+0.42
77	+0.26	-0.17	----	----	----	----
78	-0.55	+0.56	-1.75	-0.26	+0.27	+0.48

TABLE AII.475 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	+0.37	-1.20	-0.95	-0.30	+1.38	-0.25
80	+0.05	-0.01	-1.30	-0.95	+0.65	-0.10
81	-0.39	+0.20	-0.93	+0.24	-0.35	+0.25
82	+0.06	-0.12	-1.00	----	----	----
83	+0.40	-0.30	-1.58	-0.91	-1.01	+0.03
84	+0.01	+0.07	-0.81	+0.34	+0.54	+0.91
85	+0.09	-0.17	-1.23	-0.14	-0.38	+1.12
86	-0.26	+0.36	-1.16	-0.21	-1.02	+0.44
87	-0.12	+0.27	----	----	----	----
88	-0.21	+0.37	----	----	----	----
99	----	-0.03	----	-0.25	-0.34	+0.10
100	----	-0.03	----	+1.81	+1.20	+3.70
101	----	-0.04	----	+1.00	+0.19	+5.35

TABLE AII.476

NITROGEN BALANCE: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	+1.0	+0.6	-12.3	-9.1	+5.3	+8.2
2	-1.3	+0.5	----	----	----	----
3	+3.5	+0.6	-11.8	-3.9	+2.9	+8.6
4	+3.0	+0.8	-12.2	-4.3	+1.9	+6.5
5	+0.4	-1.7	-7.6	----	----	----
6	+4.3	+3.5	-10.2	-8.9	+3.7	+9.7
7	+1.8	+2.1	-10.6	-7.9	+3.5	+7.2
8	-3.3	+0.8	-9.3	-8.5	+5.7	+9.5
9	+4.3	+4.0	-12.7	-9.7	+0.1	+8.2
10	+1.7	+0.9	-4.8	-5.4	+1.2	+13.5
11	+5.3	+0.6	-5.4	-3.6	+3.7	+1.4
12	+9.7	+0.4	-4.2	-5.4	+0.6	+7.3
13	+0.3	+1.1	-8.8	----	----	----
14	-1.6	+2.9	-13.4	-10.0	+1.1	+12.9
15	+4.3	-1.1	-10.5	-6.5	+7.7	----
16	+4.1	+1.6	-6.4	----	----	----
17	+6.1	----	-9.0	-10.0	+1.0	+9.6
18	+0.4	+2.7	-4.7	-5.2	+3.0	+7.6
19	+1.9	+0.9	-1.7	-3.7	+2.6	+2.6
20	+2.4	+1.4	+0.7	----	----	----
21	+0.9	-0.3	+0.1	-2.0	+2.2	+6.2
22	+2.0	-0.2	+0.2	-2.7	+1.1	+3.7
90	----	+8.4	----	+11.1	-1.2	-0.7
91	----	+15.2	----	+6.9	+17.2	+7.2
92	----	+8.4	----	-0.6	-3.0	+7.6

TABLE AII.477

NITROGEN BALANCE: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	-0.2	-3.0	-9.8	-13.5	+3.6	+11.2
24	+1.0	+2.0	-12.6	-17.4	+5.0	----
25	+1.2	-2.6	-14.5	-18.2	+0.6	+10.3
26	+1.8	+2.4	-13.3	-14.2	+1.7	+12.1
27	+0.9	+0.7	-8.8	-9.8	+5.7	+11.4
28	+9.1	0.0	-11.5	-10.1	+1.5	+10.7
29	-0.6	-1.7	-10.7	-9.8	+3.1	+11.6
30	----	+1.9	-7.9	-6.2	+9.5	+10.9
31	+0.1	+0.4	-5.8	----	+7.1	-0.2
32	+4.2	-0.9	-6.4	-7.3	+9.6	+7.1
33	+3.3	-1.0	-2.7	-6.1	+4.3	+12.4
34	-0.5	-2.5	+2.2	-5.2	+6.0	+6.1
35	+4.7	+1.7	-10.0	-9.0	+3.9	+10.5
36	+4.8	+0.6	-9.5	-8.5	+5.7	+15.3
37	+0.2	+1.0	-8.9	-7.1	+6.2	+6.7
38	-0.4	+1.6	-8.5	-6.9	+4.2	+9.6
39	+0.3	+1.2	-7.8	-5.8	----	----
40	+1.0	-2.1	----	----	+5.2	-2.9
41	+3.5	-0.2	----	----	----	----
42	+6.1	+2.5	-6.8	-7.0	+5.3	+15.0
43	-0.9	+1.5	-0.4	-2.2	+4.5	+8.3
44	+4.4	+1.5	-2.9	-3.6	-1.7	+9.4
93	----	----	----	----	----	----
94	----	+6.3	----	-0.7	+6.6	+3.7
95	----	+6.0	----	+1.1	+0.6	+6.0
102	----	----	----	-2.7	+6.6	+6.5

TABLE AII.478

NITROGEN BALANCE: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	+2.9	+1.2	-14.4	-10.5	+1.5	+9.6
46	-0.5	-3.6	-8.4	-13.0	+4.8	+11.9
47	+2.6	-1.7	-6.1	-10.8	+6.2	+5.4
48	+3.9	+0.8	-10.4	-13.2	+4.3	+13.3
49	+1.2	-0.9	-9.7	-9.1	+2.0	+10.6
50	+3.8	-1.2	-8.3	-6.4	+2.4	+10.9
51	+0.9	-4.2	-4.9	-7.4	+2.6	+10.1
52	+4.7	-1.0	-8.9	-7.2	+6.4	+10.8
53	+2.7	-0.4	-2.5	-5.5	+1.9	+5.0
54	-1.8	-1.3	-19.5	-14.6	-0.6	+16.3
55	-0.1	+5.1	-2.7	+2.1	+0.1	+11.9

TABLE AII.478 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
56	+3.8	+2.2	-9.3	-7.3	-0.4	+14.8
57	+2.1	+4.3	-11.1	-8.8	+6.0	+13.3
58	+1.2	-11.1	----	+1.1	+4.2	-4.7
59	----	----	-8.5	-6.0	+7.3	+8.7
60	-4.7	-2.7	-8.4	-6.5	+6.8	+6.7
61	-0.3	+1.7	-9.0	-7.4	+0.1	+10.2
62	+3.5	+2.5	-7.7	-6.7	+3.7	+3.4
63	-0.8	-0.9	-7.4	-5.2	-2.7	+10.2
64	+3.7	-1.6	-4.6	-5.1	+1.3	+9.3
65	+3.2	+4.0	-3.1	-3.3	+0.2	+7.6
66	+2.7	+2.7	-4.5	-2.9	-1.0	+10.3
96	----	+8.1	----	+2.1	-3.9	+11.5
97	----	+7.5	----	-2.7	+13.3	+4.3
98	----	+7.2	----	+4.9	+10.1	+7.1

TABLE AII.479

NITROGEN BALANCE: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	+2.9	+3.8	-8.1	-10.8	+2.5	+15.1
68	+2.9	+1.2	-8.3	-8.5	+0.5	+6.2
69	+0.1	-1.2	-8.2	-14.2	-0.1	+10.1
70	+3.9	-0.5	-16.5	----	+1.3	+7.8
71	+5.0	+0.2	-9.6	-9.1	+1.3	+12.8
72	+1.0	+0.9	-7.0	-8.1	+0.4	+10.9
73	+1.1	0.0	-6.1	-5.9	+3.8	----
74	-2.9	-5.6	-10.0	-9.2	+3.9	+12.1
75	+4.8	+1.9	-5.7	-7.1	+1.7	+9.9
76	+4.3	+2.8	-8.8	-7.9	+1.4	+11.8
77	+4.9	+3.7	----	----	----	----
78	+1.6	+2.3	+5.8	-6.1	+2.7	+13.1
79	+3.9	+0.2	-10.4	-6.4	-0.3	+12.9
80	+3.1	+1.3	-9.7	-7.7	+1.8	+8.0
81	+2.5	+1.4	-6.4	-6.8	+2.1	+12.4
82	+7.4	+2.5	-8.2	----	----	----
83	+4.7	+2.7	-2.7	-7.1	+0.3	+12.1
84	+3.5	+2.7	-2.4	-6.1	+4.5	+10.4
85	+5.0	+0.7	+0.6	-1.8	+2.2	+9.8
86	-0.2	+0.5	-3.2	-4.0	+4.5	+7.9
87	+1.2	+1.3	-0.6	----	----	----
88	+1.8	+0.9	-6.0	----	----	----
99	----	+9.1	----	-0.1	+8.6	+7.6
100	----	+3.5	----	+2.7	+3.8	+4.6
101	----	+8.0	----	-0.9	+11.5	+8.3

TABLE AII.480

SODIUM BALANCE: FLIGHT 1
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	+106	-8	-91	-51	-36	+128
2	+31	-20	---	---	---	---
3	+95	+15	-139	-28	+34	+132
4	+69	-4	-108	+46	-19	+8
5	+43	-22	-104	---	---	---
6	+49	-15	-108	-73	+39	+78
7	-22	-40	-107	-67	-35	+85
8	+78	+54	-51	-24	-17	+104
9	+82	+16	-82	-47	-12	+147
10	+59	-24	-95	-20	+103	+73
11	+43	-18	-106	-39	+38	+27
12	-10	-24	-50	-27	+65	+119
13	+68	+44	-133	---	---	---
14	+36	-40	-157	-108	-15	+155
15	+78	+64	-74	-17	+57	---
16	+104	+17	-96	---	---	---
17	-39	---	-95	-45	+28	+94
18	+80	+2	-39	-7	+43	+16
19	+77	+8	+6	+14	+51	---
20	+71	+41	+11	---	---	---
21	+46	-63	-25	-26	+21	+130
22	+64	-21	-39	-22	+60	-4
90	---	---	---	---	---	---
91	---	---	---	---	---	---
92	---	---	---	---	---	---

TABLE AII.481

SODIUM BALANCE: FLIGHT 2
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	+80	-55	-126	-76	+142	+22
24	+37	-18	-154	-81	+187	+187
25	+86	-25	-141	-56	+82	+122
26	+72	-2	-81	-42	+46	+145
27	+93	+58	-63	-37	+96	+123
28	+150	-35	-123	-84	+3	+85
29	+51	-60	-99	-80	+90	+49
30	---	+29	-106	-66	+108	+87
31	+61	-13	-129	---	-183	+6
32	+110	0	-51	-18	+186	+75
33	+110	-9	-38	+6	+91	+89
34	+40	-8	-37	-16	+95	+36

TABLE AII.481 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	+104	-6	-80	-38	-3	+105
36	+66	-39	-105	-45	+6	+87
37	+85	+1	-70	-14	+21	+15
38	+41	-5	-105	-58	-75	+122
39	+33	+4	-65	---	---	---
40	+55	---	---	---	-10	-21
41	+104	-20	---	---	---	---
42	+90	-33	-98	-56	+114	+202
43	+38	-16	-32	-11	+106	+83
44	-56	-84	-46	+24	+63	+57
93	---	---	---	---	---	---
94	---	---	---	---	---	---
95	---	---	---	---	---	---
102	---	---	---	---	---	---

TABLE AII.482

SODIUM BALANCE: FLIGHT 3
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	-6	-38	-116	-59	+35	+29
46	-33	+35	-96	-77	+121	+93
47	+38	-33	-46	-28	+81	-6
48	+5	-39	-88	-51	+44	+121
49	+33	-10	-80	-51	+11	+153
50	+54	-92	-81	-43	+14	+102
51	+82	-99	-67	-50	+41	+47
52	+49	-37	-58	-50	-38	+69
53	+66	-14	-14	-45	+36	+61
54	+29	+51	-126	-57	+16	+85
55	+38	+86	-53	-34	-5	+117
56	-22	-61	-97	+90	+44	+108
57	-16	+35	-32	-54	+28	+123
58	-3	---	---	---	-147	-43
59	---	---	-42	-89	+8	+115
60	+22	-14	-87	-56	+57	+90
61	+149	-3	-82	-52	+39	+136
62	+68	-21	-83	-66	+45	+116
63	+7	-102	+1	-76	-40	+199
64	+79	-34	+32	-44	+16	+56
65	+86	-17	-9	+4	0	+94
66	+36	+35	-42	-64	+27	+81
96	---	---	---	---	---	---
97	---	---	---	---	---	---
98	---	---	---	---	---	---

TABLE AII.483

SODIUM BALANCE: FLIGHT 4
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	+66	+20	-136	-97	+196	+94
68	+34	-9	-86	---	+33	---
69	+50	-49	-59	-53	+46	+38
70	+73	-13	-118	---	+6	+73
71	+87	-31	-93	-83	+37	+98
72	+16	+36	-50	-45	-41	+112
73	+23	-4	-54	-32	---	---
74	-40	+25	-58	-41	+78	+131
75	-1	+38	-16	-19	-1	+94
76	0	-2	-13	-8	+24	+150
77	+1	-63	---	---	---	---
78	+25	0	-34	+13	+79	+99
79	+107	-61	-68	-87	+66	+81
80	+48	-17	-86	-73	+65	+30
81	+19	-20	+12	-47	+4	+72
82	+84	+28	-60	---	---	---
83	+48	-15	-38	-63	+38	+83
84	+62	+2	+7	0	+52	+81
85	+65	-49	+32	+21	+40	+84
86	-50	+15	+44	+20	+10	+119
87	+30	-11	---	---	---	---
88	+22	+3	---	---	---	---
99	---	---	---	---	---	---
100	---	---	---	---	---	---
101	---	---	---	---	---	---

TABLE AII.484

POTASSIUM BALANCE: FLIGHT 1
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	+39	-3	-66	-43	+90	+208
2	+22	-9	---	---	---	---
3	+32	+5	-65	-21	+22	+72
4	+30	-6	-50	-39	+11	+41
5	+36	-6	-40	---	---	---
6	+53	+10	-67	-54	+57	+62
7	+18	-46	-83	-59	+50	+59
8	+20	-7	-55	-42	+40	+71
9	+53	+7	-85	-51	+10	+80
10	-3	-10	-48	-34	+14	+65
11	+33	-6	-68	-43	+22	+63
12	+13	+6	-61	-41	+13	+56

TABLE AII.484 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	+39	-21	-82	---	---	---
14	-7	-25	-77	-69	+14	+56
15	+47	-16	-57	-36	+48	---
16	+44	-8	-69	---	---	---
17	+20	---	-73	-44	+19	+73
18	+37	-2	-57	-42	+26	+34
19	+33	+8	-30	-18	+34	+59
20	+26	+12	-19	---	---	---
21	+26	-8	-42	-43	-4	+54
22	+34	-22	-62	-38	-8	+33
90	---	+23	---	+26	-31	-18
91	---	+43	---	-28	+30	+73
92	---	+39	---	-124	-90	+7

TABLE AII.485

POTASSIUM BALANCE: FLIGHT 2
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	+19	+15	-61	-51	+19	+32
24	+24	-15	-93	-81	+49	---
25	+8	-12	-75	-68	+29	+48
26	+36	-2	-64	-74	+19	+52
27	+35	-3	-57	-44	+46	+39
28	+60	-39	-101	-89	-1	+38
29	+29	-7	-66	-52	+50	+42
30	---	+5	-59	-44	+57	+30
31	-15	-11	-56	---	-35	-94
32	+42	-6	-37	-25	+52	+41
33	+51	-10	-70	-48	+32	+16
34	+7	-9	-42	-28	+23	+16
35	+25	+3	-57	-44	+18	+22
36	+29	-20	-48	-26	+55	+24
37	+29	-24	-86	-57	+48	+27
38	-24	-10	-59	-20	+16	+13
39	-17	-15	-72	---	---	---
40	+12	-64	---	---	-3	-111
41	+30	-50	---	---	---	---
42	+23	-41	-117	-77	+22	+38
43	+18	-52	-63	-22	+34	+17
44	+45	-38	-62	-10	-8	+18
93	---	---	---	---	---	---
94	---	+1	---	-85	+36	-48
95	---	-4	---	-33	-16	-9
102	---	---	---	-35	+13	+5

TABLE AII.486

POTASSIUM BALANCE: FLIGHT 3
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	+32	-29	-93	-91	+23	+49
46	+19	-13	-47	-62	+57	+63
47	+31	0	-32	-53	+57	+42
48	+10	-11	-57	-73	+40	+68
49	+31	-17	-72	-64	+16	+78
50	+32	-33	-49	-40	+43	+67
51	+39	-53	-52	-53	+49	+71
52	+42	-33	-53	-41	-10	+64
53	+31	+6	-17	-34	+31	+43
54	+3	-18	-75	-80	+20	+83
55	+34	+23	-24	-6	+5	+65
56	+31	+3	-37	-49	+5	+128
57	-1	-6	-27	-33	+46	+64
58	+31	-37	---	---	-12	-32
59	---	---	-121	-148	-2	+38
60	+14	-12	-49	-49	+43	+21
61	+66	-31	-98	-107	+2	+59
62	+40	-12	-49	-59	+21	+21
63	+17	-57	-15	-82	-19	+81
64	+85	-30	-30	-75	+25	+34
65	+55	+12	-36	-60	+20	+35
66	+40	-14	-65	-99	-15	+34
96	---	-13	---	-53	-31	+1
97	---	+19	---	-69	-26	-9
98	---	-8	---	-26	+59	-15

TABLE AII.487

POTASSIUM BALANCE: FLIGHT 4
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	+60	-14	-68	-83	+56	+80
68	+39	-10	-60	---	0	---
69	+31	-28	-50	-89	+11	+58
70	+55	-21	-85	---	+12	+56
71	+61	-6	-61	-60	+38	+72
72	+30	-11	-52	-57	+15	+87
73	+13	-6	-39	-46	---	---
74	+15	-49	-44	-37	+64	+58
75	+16	-10	-34	-73	+10	-7
76	-21	-37	-58	-77	-14	+38
77	-3	-24	---	---	---	---
78	+18	+5	-34	-67	+21	+71

TABLE AII.487 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	+44	+43	-85	-76	+18	+47
80	+28	-40	-57	-61	-34	-39
81	+23	-36	-47	-42	+43	+63
82	+27	-42	-62	---	---	---
83	+38	-56	-44	-85	+13	+81
84	+30	-6	-31	-50	+42	+58
85	+51	-4	-14	-37	+33	+69
86	+13	-3	-12	-44	+7	+74
87	+5	-10	---	---	---	---
88	-16	-17	---	---	---	---
99	---	+18	---	-123	+2	-43
100	---	-7	---	-82	+7	-31
101	---	-50	---	-76	+6	-56

TABLE AII.488

CALCIUM BALANCE: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	-0.65	-0.88	-0.39	-0.20	0.00	-0.20
2	+0.41	-0.27	----	----	----	----
3	-0.50	-1.15	-0.35	-0.12	+0.18	-0.05
4	-0.19	-1.04	-0.24	-0.43	-0.69	-0.16
5	-0.40	-1.32	-0.17	----	----	----
6	-0.13	-1.12	-0.38	-0.34	-0.09	+0.02
7	-0.15	-1.89	-0.41	-0.38	-0.26	-0.17
8	-0.87	-1.14	-0.20	-0.55	-0.26	+0.01
9	-0.10	-0.24	-0.57	-0.75	-0.26	+0.38
10	-0.11	-0.29	-0.73	-0.71	+0.10	+0.13
11	+0.33	-0.07	-0.47	-0.33	-0.09	-0.15
12	-0.05	-0.02	-0.67	-0.68	-0.63	+0.03
13	+0.47	-0.78	-0.27	----	----	----
14	-1.54	-0.76	-1.32	-1.28	-0.10	+0.33
15	-0.19	-1.32	-0.57	-0.55	----	----
16	+0.76	+0.29	-0.47	----	----	----
17	+0.20	----	-0.60	-0.55	-0.71	+0.45
18	-0.03	-0.38	-0.65	-0.62	+0.22	+0.18
19	+0.39	+0.12	-0.48	-0.43	-0.52	+0.19
20	+0.33	-0.13	-0.69	----	----	----
21	+0.09	+0.02	-0.11	-0.28	-0.04	+0.37
22	-0.34	-0.18	-0.52	-0.41	-0.27	+0.25
90	----	+0.26	----	+0.56	+0.09	-1.22
91	----	+0.19	----	+0.48	+0.29	-1.35
92	----	-0.08	----	0.00	+0.15	-0.29

TABLE AII.489

CALCIUM BALANCE: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	-0.26	-0.13	-0.48	-0.48	-0.52	+0.37
24	-0.01	+0.23	-0.24	-0.23	+0.60	----
25	-0.47	-0.14	-0.45	-0.50	-0.37	+0.35
26	-0.39	-0.01	-0.50	-0.48	-0.14	+0.48
27	-0.42	+0.05	-0.20	-0.18	+0.23	+0.33
28	+0.02	-0.08	-0.71	-0.70	-0.48	+0.49
29	+0.01	+0.02	-0.23	-0.23	-0.03	+0.41
30	----	-0.03	-0.25	-0.24	-0.08	+0.59
31	-0.17	-0.16	-0.81	----	+1.50	-0.06
32	-0.13	-0.02	-0.21	-0.35	+0.05	+0.35
33	+0.61	-0.18	-0.16	-0.43	+0.07	+0.12
34	-0.01	-0.01	-0.24	-0.30	+0.25	+0.18
35	+0.11	+0.15	-0.22	-0.24	0.00	+0.20
36	-0.07	-0.33	-0.27	-0.30	+0.35	-0.03
37	+0.67	+0.14	-0.16	-0.45	-0.10	+0.42
38	-0.11	+0.04	-0.28	-0.23	-0.02	-0.04
39	-0.06	+0.06	-0.67	-0.24	----	----
40	+0.42	-0.37	----	----	+0.49	+0.02
41	+0.57	-0.23	----	----	----	----
42	0.00	-0.15	-0.35	-0.34	-0.02	+0.42
43	-0.27	-0.08	-0.46	-0.28	-0.12	+0.47
44	+0.20	+0.18	-0.09	-0.28	-0.42	+0.77
93	----	----	----	----	----	----
94	----	+0.21	----	-0.96	-0.83	-0.57
95	----	0.00	----	-0.51	-0.22	-0.55
102	----	----	----	-0.08	-0.34	+0.95

TABLE AII.490

CALCIUM BALANCE: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	RREC I	REC II
45	-0.10	-0.12	-0.41	-0.36	+0.05	+0.43
46	-0.53	-0.18	-0.23	-0.23	-0.10	+0.31
47	-0.29	-0.47	-0.34	-0.39	-0.12	-0.07
48	-0.17	-0.17	-0.57	-0.64	-0.12	+0.21
49	+0.21	-0.16	-0.32	-0.32	-1.30	+0.39
50	-0.19	-0.25	-0.30	-0.25	-0.38	+0.28
51	+0.09	-0.59	-0.39	-0.40	-0.56	+0.45
52	-0.29	-1.12	-0.32	-0.35	+0.14	+0.32
53	-0.20	-0.31	-0.20	-0.43	-0.45	+0.37
54	-0.09	-0.48	-0.50	-0.50	-0.72	+0.32
55	+0.29	-0.34	-0.16	-0.14	-0.20	+0.28

TABLE AII.490 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
56	+0.49	-0.26	-0.76	-0.78	-0.28	+0.39
57	+0.04	-0.24	-0.21	-0.25	+0.34	+0.35
58	-0.25	-0.73	----	----	-0.39	-1.07
59	----	----	-0.87	-0.92	-0.50	+0.10
60	-0.26	-0.31	-0.36	-0.41	-0.03	+0.07
61	+0.72	+0.02	-0.19	-0.35	-0.06	+0.58
62	-0.44	-0.06	-0.25	-0.20	-0.10	-0.64
63	+0.42	-0.07	-0.02	-0.45	-1.22	-0.16
64	+0.80	-0.35	0.00	-0.04	-0.12	+0.31
65	-0.52	-0.26	-0.15	-0.38	-0.24	+0.08
66	-0.50	-0.30	-0.27	-0.38	-0.45	-0.32
96	----	-0.25	----	+0.44	-0.68	-0.32
97	----	-0.03	----	-0.49	-0.09	-0.93
98	----	-0.04	----	+0.73	+1.69	-0.73

TABLE AII.491

CALCIUM BALANCE: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	+0.14	+0.02	-0.18	-0.33	-0.29	-0.07
68	-0.13	+0.12	-0.37	----	-0.16	----
69	-0.61	-0.25	-0.32	-0.39	-0.13	+0.18
70	0.00	-0.50	-1.00	----	-0.14	+0.14
71	-0.15	+0.10	-0.23	-0.23	-0.06	+0.13
72	-0.04	+0.07	-0.24	-0.30	-0.68	-0.01
73	-0.31	-0.29	-0.34	-0.38	-0.06	----
74	-0.65	-0.20	-0.38	-0.34	-0.08	+0.15
75	+0.04	-0.08	-0.39	-0.43	+0.14	+0.53
76	-0.51	-0.33	-0.29	-0.32	-0.06	-0.02
77	-0.12	+0.12	----	----	----	----
78	+0.07	+0.18	-0.33	-0.61	-1.11	+0.07
79	-0.23	+0.05	-0.56	-0.61	-0.02	+0.17
80	+0.03	+0.14	-0.37	-0.40	0.00	+0.53
81	-0.36	-0.10	-0.52	-0.45	-0.56	+0.37
82	-0.12	-0.17	-0.32	----	----	----
83	+0.02	+0.04	-0.21	-0.34	-0.02	+0.54
84	-0.24	+0.17	-0.28	-0.29	-0.05	+0.30
85	-0.03	-0.13	-0.19	-0.25	-0.22	+0.28
86	-0.69	-0.14	-0.22	-0.35	-0.01	+0.32
87	-0.50	+0.28	----	----	----	----
88	+0.06	-0.33	----	----	----	----
99	----	+0.27	----	-0.40	+0.13	-0.07
100	----	+0.19	----	+0.75	+0.62	+0.35
101	----	-0.47	----	-0.29	+0.37	+0.58

TABLE AII.492

PHOSPHORUS BALANCE: FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	+0.82	+0.34	-0.80	-0.50	+1.08	+1.53
2	+1.27	+0.55	----	----	----	----
3	+1.24	+0.67	-0.80	+0.10	+1.29	+1.79
4	+1.13	+0.51	-0.66	-0.16	+0.49	+0.59
5	+0.78	+0.34	-0.49	----	----	----
6	+1.72	+1.04	-0.75	-0.70	+0.85	+1.61
7	+0.91	+0.59	-0.75	-0.76	+1.04	+1.52
8	+0.47	+0.50	-0.53	-0.71	+0.96	+1.61
9	+1.11	+0.56	-0.80	-0.59	+0.60	+1.48
10	+0.28	+0.24	-0.61	-0.51	+0.97	+2.01
11	+1.52	+0.71	-0.71	-0.24	+0.99	+1.37
12	+0.71	+0.68	-0.53	-0.19	+0.81	+1.55
13	+0.70	+0.32	-0.59	----	----	----
14	+1.24	+0.41	-1.29	-1.17	+0.98	+2.35
15	+1.28	-0.20	-0.35	-0.16	+1.37	----
16	+1.79	+0.94	-0.09	----	----	----
17	+0.81	-0.79	-0.57	-0.44	+0.47	+1.25
18	+1.20	+0.56	-0.32	-0.41	+0.96	+1.93
19	+1.21	+0.93	-0.10	-0.32	+0.83	+1.44
20	+1.10	+0.75	-0.07	----	----	----
21	+1.34	+0.59	+0.16	+0.19	+0.80	+1.72
22	+1.19	+0.61	-0.03	-0.04	+0.99	+1.35
90	----	+0.69	----	+1.02	+0.04	-0.78
91	----	+1.12	----	+0.83	+1.78	+0.04
92	----	+0.72	----	+0.14	+0.16	+0.40

TABLE AII.493

PHOSPHORUS BALANCE: FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	+0.64	+0.39	-0.64	-0.64	+0.47	+1.61
24	+1.24	+0.93	-1.32	-1.18	+1.99	----
25	+0.81	+0.53	-1.08	-1.29	+0.83	+2.13
26	+1.29	+0.85	-1.21	-1.30	+1.17	+2.68
27	+1.66	+1.09	-0.97	-0.99	+1.67	+2.43
28	+1.36	+0.66	-0.95	-0.90	+0.62	+2.19
29	+0.82	+0.53	-0.64	-0.72	+1.22	+1.89
30	----	+0.81	-0.54	-0.44	+1.50	+1.86
31	+0.09	+0.36	-0.54	+0.24	+1.45	-0.43
32	+1.27	+0.77	-0.53	-0.57	+1.41	+1.77
33	+1.22	+0.44	-0.29	-0.60	+1.05	+1.37
34	+0.74	+0.37	-0.04	-0.03	+1.33	+1.30

TABLE AII.493 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	+1.21	+0.62	-0.68	-0.57	+1.07	+1.81
36	+0.97	+0.25	-0.56	-0.43	+1.49	+1.88
37	+1.07	+0.74	-0.41	-0.26	+1.22	+1.48
38	+0.27	+0.33	-0.28	-0.22	+0.67	+1.35
39	+0.15	+0.55	-0.51	-0.27	----	----
40	+1.41	+0.15	----	+0.33	+0.78	-0.61
41	+1.55	+0.51	----	----	----	----
42	+0.85	+0.53	-0.50	-0.34	+1.30	+2.22
43	+1.00	+0.57	-0.18	+0.16	+1.30	+1.71
44	+1.60	+1.24	-0.26	-0.33	+0.38	+2.00
93	----	----	----	----	----	----
94	----	+0.56	----	-0.76	+0.30	-0.86
95	----	+0.53	----	-0.09	+0.43	0.00
102	----	----	----	+0.24	+0.37	+0.38

TABLE AII.494

PHOSPHORUS BALANCE: FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	+1.17	+0.71	-1.20	-1.09	+1.08	+2.17
46	+0.98	+0.15	-0.54	-0.80	+1.14	+2.13
47	+0.77	+0.52	-0.45	-0.83	+1.35	+1.22
48	+1.02	+0.66	-0.59	-0.80	+0.99	+1.74
49	+1.50	+0.74	-0.49	-0.53	+1.02	+2.15
50	+1.25	+0.54	-0.58	-0.39	+0.83	+2.13
51	+1.19	-0.19	-0.38	-0.41	+0.82	+1.50
52	+1.26	-0.11	-0.46	-0.28	+1.29	+1.98
53	+0.94	+0.47	+0.08	-0.32	+0.92	+1.48
54	+0.20	+0.26	-1.25	-1.08	+0.38	+2.11
55	+0.95	+0.61	-0.37	+0.19	+0.90	+1.98
56	+1.22	+0.71	-0.53	-0.57	+0.72	+2.37
57	+0.49	+0.62	-0.24	-0.39	+1.29	+1.76
58	+1.71	-0.45	----	-0.02	+0.30	-0.82
59	----	----	-0.71	-0.38	+1.25	+1.38
60	+0.58	+0.28	+0.23	-0.08	+1.08	+1.07
61	+1.88	+0.81	-0.19	-0.47	-0.68	+1.89
62	+1.16	+0.87	-0.46	-0.34	+0.96	+1.11
63	+1.37	+0.59	+0.33	-0.29	+0.26	+2.13
64	+1.92	+0.76	+0.20	+0.01	+1.19	+2.16
65	+1.74	+0.89	-0.17	-0.10	+0.84	+1.81
66	+1.57	+0.77	-0.22	+0.10	+0.90	+1.90
96	----	+0.64	----	+0.49	-0.23	+0.39
97	----	+0.73	----	-0.48	+0.56	-0.08
98	----	+0.34	----	+0.64	+2.02	-0.10

TABLE AII.495

PHOSPHORUS BALANCE: FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	+1.72	+0.98	-0.85	-0.89	+1.19	+2.66
68	+1.13	+0.73	-0.89	-0.84	+0.80	+1.56
69	+0.65	+0.58	-0.58	-1.00	+0.90	+2.21
70	+1.50	+0.45	-1.29	-0.66	+0.94	+2.31
71	+1.49	+0.74	-0.67	-0.61	+0.63	+2.40
72	+1.10	+0.76	-0.36	-0.45	+0.54	+1.93
73	+0.90	+0.42	-0.50	-0.33	+0.76	----
74	+0.58	-0.15	-0.76	-0.26	-1.29	+1.62
75	+1.07	+0.61	-0.09	-0.53	+0.77	+1.92
76	+0.36	+0.27	-0.71	-0.64	+0.63	+1.55
77	+1.07	+0.91	----	----	----	----
78	+0.91	+0.74	+0.16	-0.54	+0.97	+1.97
79	+1.39	+0.57	-0.73	-0.64	+1.08	+1.74
80	+1.14	+0.80	-0.64	-0.59	+1.10	+2.12
81	+1.06	+0.69	+0.18	-0.27	+0.91	+2.07
82	+1.72	+0.18	-0.26	----	----	----
83	+1.29	+0.94	-0.18	-0.46	+1.03	+2.28
84	+1.27	+0.88	-0.26	-0.42	+1.22	+2.22
85	+1.22	+0.69	+0.10	-0.16	+1.12	+1.89
86	+0.67	+0.39	+0.12	-0.12	+1.16	+1.67
87	+0.91	+0.75	-0.35	----	----	----
88	+0.47	+0.51	-0.49	----	----	----
99	----	+0.73	----	-0.05	+0.83	+0.53
100	----	+0.30	----	+0.46	+0.65	+0.30
101	----	+0.45	----	+0.13	+1.09	+0.17

TABLE AII.496

CHLORIDE BALANCE: FLIGHT 1
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	+69	+14	-77	-24	-24	+75
2	-56	+35	----	----	----	----
3	-17	+21	-104	-33	+25	+90
4	+35	+11	-75	-18	-18	+49
5	+8	-15	-83	----	----	----
6	+22	-14	-84	-52	+94	+43
7	+11	-8	-80	-37	-44	+29
8	+41	+56	-40	-17	-8	+43
9	+55	+30	-105	-61	-8	+102
10	+24	-3	-105	-52	+101	+32
11	+10	+10	-168	-116	0	-6
12	+21	-9	-142	-112	+57	+87

TABLE AII.496 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	+111	+37	-120	---	---	---
14	+7	+3	-143	-62	-10	+89
15	+36	+43	-52	+11	+60	---
16	+71	+14	-66	---	---	---
17	-24	---	-140	-79	+20	+92
18	+64	+3	-87	-49	+45	+23
19	+47	+23	-54	-33	+33	---
20	+31	+27	-40	---	---	---
21	+4	-15	-57	-47	+9	+74
22	-52	+1	-94	-64	+52	-42
90	---	---	---	---	---	---
91	---	---	---	---	---	---
92	---	---	---	---	---	---

TABLE AII.497

CHLORIDE BALANCE: FLIGHT 2
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	+71	-54	-101	-55	+152	+28
24	+31	-11	-125	-45	---	---
25	+56	-27	-126	-43	+82	+38
26	+46	-1	-100	-31	+44	+86
27	+53	+40	-59	-25	+116	+72
28	+139	-27	-101	-57	+29	+52
29	+19	-56	-153	-104	+106	+25
30	---	+42	-94	-49	+94	+56
31	+52	-2	-130	---	---	---
32	+94	+3	-86	-35	+155	+37
33	+93	-6	-124	-77	+47	+55
34	+18	+7	-118	-88	+57	+13
35	+79	+31	-60	-2	+3	+65
36	+48	-25	-90	-23	+22	+44
37	+62	+31	-37	+36	+88	+15
38	+6	-9	-81	-9	-84	+52
39	+17	+16	-98	---	---	---
40	+42	---	---	---	---	---
41	-18	+4	---	---	---	---
42	+52	-30	-133	-76	+83	+49
43	+33	+8	-60	-30	+79	+52
44	+65	-47	-60	-14	+54	+25
93	---	---	---	---	---	---
94	---	---	---	---	---	---
95	---	---	---	---	---	---
102	---	---	---	---	---	---

TABLE AII.498

CHLORIDE BALANCE: FLIGHT 3
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	+26	-28	-87	-55	+40	+33
46	-43	+51	-74	-58	+127	+40
47	+60	-28	-41	-26	+100	-5
48	+46	-14	-74	-44	+62	+35
49	+46	0	-72	-42	+42	+67
50	+39	-39	-67	-33	+51	+82
51	+122	-59	-47	-39	+73	+216
52	+74	-13	-46	-43	-21	+2
53	+82	-6	-46	-55	+37	+42
54	+32	-39	-95	-38	+57	+115
55	+58	+87	-129	-105	-11	+117
56	+1	-47	-154	-112	+17	+62
57	+3	+23	-11	-19	+26	+76
58	+18	---	---	---	---	---
59	---	---	-20	-2	+3	+62
60	+28	-35	-62	-37	+3	+36
61	+162	-24	-105	-55	+47	+91
62	+77	-37	-102	-73	-8	+85
63	+31	-50	-40	-102	-39	+179
64	+143	-70	-10	-60	0	+28
65	+94	-9	-40	-64	+4	+22
66	+52	+34	-45	-80	+14	+150
96	---	---	---	---	---	---
97	---	---	---	---	---	---
98	---	---	---	---	---	---

TABLE AII.499

CHLORIDE BALANCE: FLIGHT 4
(mEq/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	+104	+6	-139	-105	+163	+64
68	+43	-22	-120	---	+26	---
69	+65	-44	-72	-40	+88	-1
70	+64	-29	-162	---	+2	-3
71	+124	-51	-109	-64	+80	+77
72	+34	+11	-60	-29	-46	+68
73	+32	+3	-65	-23	---	---
74	-4	+8	-65	-43	+86	+146
75	+3	+32	-71	-50	+27	+27
76	+10	-6	-78	-53	+25	+107
77	+22	-32	---	---	---	---
78	+62	+10	-141	-72	+59	+95

TABLE AII.499 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	+112	-58	-61	-50	+62	+77
80	+66	-12	-88	-44	+63	+117
81	+49	+19	+37	-11	-36	+63
82	+94	+4	-49	---	---	---
83	+81	-20	-66	-47	+36	+42
84	+87	0	-38	-33	+61	+34
85	+80	-57	-28	-21	+15	+61
86	-32	-10	-15	-26	-1	+58
87	+55	-20	---	---	---	---
88	+45	-9	---	---	---	---
99	---	---	---	---	---	---
100	---	---	---	---	---	---
101	---	---	---	---	---	---

TABLE AII.500

BODY FAT - PER CENT BODY WEIGHT: FLIGHT 1

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	6.8	7.5	6.0	5.6	6.2	5.3
2	2.5	3.2	3.0	---	---	3.6
3	3.9	3.5	2.9	2.9	3.5	3.5
4	4.0	4.2	4.5	3.8	4.8	4.6
5	3.5	3.0	2.8	---	---	3.1
6	5.6	6.9	5.6	5.2	5.9	5.9
7	2.9	3.0	3.0	2.7	2.7	3.0
8	7.3	8.0	8.1	7.5	7.5	7.7
9	7.8	8.9	9.0	8.1	7.1	8.8
10	2.5	3.1	3.0	2.6	3.1	3.2
11	8.3	8.5	8.6	7.7	8.5	8.6
12	7.2	7.0	7.0	5.9	6.1	6.2
13	4.5	4.8	3.8	---	---	---
14	2.5	3.5	2.8	2.6	3.5	3.3
15	4.7	5.0	5.2	4.5	4.7	---
16	3.6	4.9	4.1	---	---	---
17	16.3	(16.3)	14.2	14.3	13.9	12.8
18	2.8	3.0	2.5	2.4	3.0	2.8
19	3.9	5.0	5.1	4.1	5.2	5.0
20	4.0	4.1	4.0	---	---	---
21	3.5	3.9	2.8	3.0	3.4	2.9
22	4.7	5.8	5.5	5.2	5.9	6.2
90	3.6	4.8	4.1	4.0	4.5	4.5
91	5.5	6.5	7.0	7.7	8.0	7.5
92	4.8	5.5	6.4	6.2	6.7	7.0

TABLE AII.501

BODY FAT - PER CENT BODY WEIGHT: FLIGHT 2

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	9.0	11.2	9.7	8.1	10.1	9.5
24	3.9	4.3	3.1	3.2	---	---
25	4.0	5.5	4.5	3.5	4.5	4.2
26	3.2	4.0	3.2	2.9	3.4	3.4
27	3.3	3.7	3.2	2.8	3.5	3.5
28	8.1	10.5	7.8	8.3	8.5	9.0
29	3.5	3.8	4.0	3.5	3.9	3.7
30	(4.8)	4.9	4.1	4.9	5.2	4.1
31	10.0	11.9	9.0	10.4	10.9	13.2
32	5.0	6.2	5.5	5.2	5.5	5.3
33	4.3	4.5	4.2	3.9	3.8	4.0
34	4.8	5.8	5.0	5.4	5.2	5.1
35	4.2	4.5	4.4	4.3	4.1	4.3
36	6.0	7.3	6.8	5.8	6.2	6.2
37	3.0	2.8	3.2	3.5	3.1	3.3
38	6.9	5.5	6.5	6.2	5.7	6.1
39	3.7	4.2	4.4	4.0	---	---
40	3.0	(5.6)	---	3.6	3.8	4.0
41	4.0	4.1	4.0	---	---	4.3
42	3.9	4.5	4.8	5.5	5.5	5.5
43	3.2	3.2	3.1	3.2	3.2	3.2
44	3.6	4.4	4.4	3.9	4.6	4.6
93	4.0	---	---	---	---	---
94	5.8	5.9	7.7	6.1	7.0	6.8
95	7.5	8.9	9.8	11.3	9.7	10.1
102	---	---	---	7.0	7.2	7.8

TABLE AII.502

BODY FAT - PER CENT BODY WEIGHT: FLIGHT 3

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	5.8	6.5	4.8	4.7	5.6	6.5
46	5.5	6.0	4.6	3.6	4.2	5.2
47	8.6	8.9	7.0	5.4	6.0	5.8
48	5.8	5.9	5.3	4.5	5.1	5.5
49	4.0	4.1	4.1	3.9	4.0	4.2
50	7.5	6.2	5.9	6.0	6.3	6.2
51	8.1	6.5	8.0	7.6	7.2	8.6
52	3.7	4.1	4.0	3.2	3.8	3.6
53	11.5	10.2	8.8	8.8	9.0	8.2
54	5.0	4.2	3.7	3.3	3.9	4.3
55	5.0	4.2	4.5	4.2	4.6	4.5
56	4.3	4.0	3.8	3.6	3.9	4.6

TABLE AII.502 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
57	6.0	6.5	5.2	5.2	5.6	5.2
58	6.5	5.2	6.0	6.0	6.7	6.1
59	(6.2)	(6.0)	3.2	3.0	3.0	3.2
60	11.2	11.1	11.1	11.1	11.0	11.2
61	3.0	3.8	3.1	3.2	3.5	3.4
62	5.9	5.9	6.2	4.8	5.1	5.5
63	5.7	4.8	5.0	5.0	4.8	4.9
64	3.5	3.5	3.5	3.1	3.1	3.5
65	9.6	10.5	10.8	10.1	8.9	10.9
66	4.0	4.8	5.1	5.0	4.6	4.4
96	3.5	4.6	4.0	3.8	4.1	4.0
97	8.5	7.2	8.0	7.7	6.9	8.0
98	5.2	6.2	5.4	5.4	6.1	6.1

TABLE AII.503

BODY FAT - PER CENT BODY WEIGHT: FLIGHT 4

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	4.0	4.2	3.0	3.4	3.8	4.0
68	4.5	5.2	4.3	4.0	4.8	---
69	4.9	5.7	4.8	4.5	5.0	5.9
70	5.2	5.0	3.9	3.5	4.4	4.2
71	4.9	5.8	4.5	4.6	5.0	5.5
72	5.0	5.0	4.8	4.1	4.5	5.2
73	3.0	3.7	3.4	3.1	---	---
74	4.0	3.5	3.2	3.0	3.6	3.7
75	7.5	9.0	6.6	6.7	6.3	7.7
76	4.2	4.5	3.7	3.8	4.0	4.2
77	5.0	5.0	5.4	---	---	---
78	3.0	3.0	3.1	2.8	3.6	4.0
79	6.0	7.0	6.0	5.5	4.8	5.8
80	3.9	4.5	4.0	3.6	4.1	3.9
81	3.9	4.0	3.6	3.5	3.8	3.7
82	(5.0)	5.1	4.6	---	---	5.2
83	4.2	5.5	4.2	4.0	4.6	4.8
84	6.8	7.5	6.7	6.1	5.9	7.0
85	5.1	5.4	4.6	4.1	5.0	4.1
86	4.0	5.1	4.0	4.1	4.8	5.2
87	11.5	15.0	---	---	---	14.9
88	4.1	4.0	---	---	---	---
99	4.0	5.7	4.5	4.6	4.9	4.7
100	13.5	14.9	12.3	11.3	11.7	12.3
101	3.2	3.9	3.7	3.5	4.5	3.2

TABLE AII.504

BODY FAT - KILOGRAMS: FLIGHT 1

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	4.4	4.9	3.7	3.3	3.9	3.4
2	1.7	2.2	1.9	---	---	2.5
3	2.3	2.1	1.6	1.6	2.0	2.1
4	3.0	3.1	3.1	2.6	3.5	3.4
5	2.0	1.7	1.5	---	---	1.8
6	3.8	4.7	3.6	3.3	3.8	4.0
7	2.1	2.2	2.1	1.8	1.9	2.1
8	4.6	5.1	4.9	4.5	4.6	4.7
9	6.4	7.3	7.0	6.1	5.6	7.0
10	1.6	1.9	1.8	1.5	1.9	2.0
11	5.7	6.0	5.8	5.1	5.9	6.0
12	5.5	5.4	5.2	4.3	4.7	4.8
13	3.0	3.2	2.4	---	---	---
14	1.6	2.3	1.8	1.6	2.3	2.2
15	3.4	3.7	3.7	3.2	3.3	---
16	2.2	3.1	2.5	---	---	---
17	14.6	(14.6)	11.8	11.7	11.6	10.8
18	1.7	1.8	1.4	1.3	1.7	1.7
19	2.2	2.8	2.9	2.3	3.0	2.8
20	2.4	2.5	2.4	---	---	---
21	2.2	2.4	1.7	1.8	2.1	1.8
22	3.0	3.6	3.4	3.2	3.7	3.9
90	2.5	3.5	3.0	3.0	3.4	3.4
91	4.3	5.1	5.5	6.1	6.4	6.0
92	3.1	3.5	4.2	4.0	4.4	4.6

TABLE AII.505

BODY FAT - KILOGRAMS: FLIGHT 2

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	7.1	8.7	7.0	5.6	7.5	7.2
24	2.1	2.3	1.5	1.5	---	---
25	2.7	3.7	2.8	2.1	2.8	2.7
26	1.7	2.2	1.6	1.4	1.8	1.8
27	1.7	2.0	1.6	1.4	1.8	1.8
28	5.3	6.9	4.8	5.0	5.4	5.9
29	2.6	2.8	2.8	2.4	2.9	2.8
30	(3.2)	3.2	2.5	3.0	3.3	2.7
31	8.3	9.8	6.7	8.3	8.9	11.0
32	3.1	3.9	3.2	3.0	3.3	3.3
33	2.8	3.0	2.5	2.4	2.5	2.6
34	2.9	3.5	2.8	3.1	3.1	3.0

TABLE AII.505 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	2.6	2.8	2.6	2.5	2.5	2.6
36	3.8	4.7	4.0	3.4	3.9	3.9
37	1.9	1.8	1.9	2.1	1.9	2.1
38	4.7	3.7	4.1	4.0	3.8	4.2
39	2.2	2.5	2.5	2.3	---	---
40	2.0	(3.7)	---	2.4	2.6	2.8
41	2.4	2.5	2.3	---	---	2.6
42	2.6	3.0	3.0	3.5	3.6	3.7
43	2.0	2.0	1.9	2.0	2.0	2.0
44	2.3	2.9	2.8	2.4	2.9	3.0
93	2.6	---	---	---	---	---
94	4.6	4.6	6.1	4.9	5.7	5.5
95	5.8	6.9	7.5	8.8	7.6	8.0
102	---	---	---	4.4	5.6	5.0

TABLE AII.506

BODY FAT - KILOGRAMS: FLIGHT 3

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	3.8	4.2	2.9	2.7	3.5	4.1
46	4.2	4.3	3.1	2.4	3.1	3.8
47	5.9	6.2	4.6	3.4	4.0	3.9
48	4.5	4.6	3.8	3.1	3.8	4.2
49	2.6	2.6	2.5	2.3	2.5	2.6
50	4.5	3.7	3.4	3.4	3.7	3.7
51	6.3	5.0	5.9	5.6	5.5	6.5
52	2.5	2.8	2.7	2.1	2.6	2.5
53	7.4	6.5	5.3	5.3	5.6	5.1
54	3.3	2.7	2.3	1.9	2.5	2.8
55	2.8	2.4	2.5	2.3	2.6	2.6
56	2.8	2.7	2.4	2.3	2.7	3.2
57	4.2	4.7	3.5	3.5	3.9	3.7
58	4.4	3.4	3.9	3.9	4.4	4.1
59	(4.4)	(4.2)	2.1	2.0	2.0	2.2
60	8.8	8.6	8.4	8.3	8.4	8.5
61	2.1	2.7	2.1	2.1	2.4	2.3
62	4.1	4.2	4.2	3.2	3.5	3.8
63	4.2	3.6	3.6	3.6	3.7	3.6
64	2.7	2.7	2.6	2.3	2.3	2.7
65	7.3	7.9	8.0	7.4	6.8	8.2
66	3.0	3.6	3.7	3.6	3.4	3.2
96	3.0	3.8	3.4	3.3	3.5	3.4
97	6.6	5.5	6.2	5.9	5.3	6.2
98	3.4	4.0	3.6	3.6	4.1	4.1

TABLE AII.507

BODY FAT - KILOGRAMS: FLIGHT 4

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
67	2.5	2.6	1.7	1.9	2.4	2.5
68	3.0	3.5	2.7	2.5	3.2	---
69	3.2	3.8	3.0	2.7	3.3	3.9
70	3.5	3.4	2.4	2.2	2.9	2.8
71	3.1	3.7	2.7	2.7	3.1	3.5
72	3.5	3.4	3.2	2.6	3.1	3.6
73	1.8	2.2	2.0	2.3	---	---
74	2.9	2.4	2.1	2.0	2.5	2.6
75	5.3	6.4	4.4	4.4	4.4	5.4
76	2.4	2.5	2.0	2.0	2.2	2.4
77	3.2	3.2	3.4	---	---	---
78	2.1	2.1	2.1	1.9	2.6	2.9
79	4.0	4.6	3.8	3.4	3.1	3.7
80	2.5	2.8	2.4	2.2	2.6	2.4
81	2.6	2.7	2.4	2.3	2.6	2.5
82	(3.4)	3.1	2.7	---	---	3.2
83	2.7	3.6	2.6	2.5	3.0	3.2
84	4.4	4.8	4.1	3.7	3.7	4.5
85	3.6	3.8	3.0	2.7	3.5	2.8
86	2.5	3.2	2.4	2.5	3.0	3.3
87	10.2	13.3	---	---	---	13.1
88	2.7	2.7	---	---	---	---
99	2.7	3.8	3.1	3.2	3.4	3.2
100	11.4	12.7	10.5	9.6	10.0	10.6
101	2.1	2.6	2.5	2.3	3.0	2.1

TABLE AII.508

DAILY BODY WEIGHT: FLIGHT 1
(kg)

Period	Date	Subject Code Number 1	2	3	4	5	6	7
P I	June 22	65.9	68.7	58.1	74.3	56.4	66.4	70.2
	23	64.9	68.3	59.2	74.6	57.4	66.9	70.8
	24	65.3	68.6	59.3	74.7	57.3	67.4	71.3
	25	64.5	68.6	59.6	75.1	57.6	67.6	71.4
	26	65.4	68.5	59.7	75.2	57.6	67.8	71.6
	27	65.3	68.3	59.7	75.1	57.1	67.6	72.0
	28	65.2	68.0	59.7	74.9	57.5	67.9	71.4
P II	29	65.6	67.8	59.8	75.0	57.9	68.0	71.4
	30	65.1	67.4	59.8	74.8	57.7	67.8	71.4
	July 1	65.2	67.7	59.8	74.5	57.7	68.0	71.6
	2	65.2	67.2	59.9	74.7	57.4	67.8	71.9
	3	64.8	67.2	60.4	74.4	57.4	67.7	71.3
	4	64.8	67.4	60.0	74.5	57.3	68.0	71.4
	5	64.7	67.5	60.1	75.0	57.5	67.8	71.5
EXP I	6	65.4	67.6	60.7	75.1	57.9	68.0	71.7
	7	64.0	65.9	59.2	72.8	56.5	66.5	70.1
	8	62.3	64.6	57.8	71.8	56.0	66.0	69.6
	9	61.4	----	56.5	70.3	55.6	65.5	69.4
	10	60.8	----	55.8	69.5	54.5	65.0	68.7
	11	60.4	----	54.9	68.8	54.7	64.7	68.8
	12	59.4	----	----	----	53.8	63.8	67.8
EXP II	13	59.4	----	55.6	69.5	54.4	63.6	67.8
	14	58.2	----	55.4	69.8	53.6	63.0	66.9
	15	60.2	----	55.4	70.2	----	62.8	67.1
	16	61.2	----	55.8	71.1	----	63.7	68.1
	17	60.7	----	55.8	70.9	----	64.6	68.4
	18	61.4	----	56.1	72.0	----	65.0	68.0
	19	62.7	----	57.0	72.6	----	64.5	69.8
REC I	20	63.1	----	57.8	73.3	----	65.9	70.0
	21	63.0	67.9	58.3	73.7	56.8	66.1	70.2
	22	63.9	67.4	58.2	73.9	57.2	66.3	70.0
	23	64.4	69.6	59.0	72.7	57.6	66.8	69.6
	24	64.5	69.4	58.9	73.8	57.2	67.2	70.7
	25	63.5	69.4	58.8	73.0	57.0	66.8	70.7
	26	64.3	69.8	59.5	73.9	58.3	67.6	71.2
REC II	27	64.9	68.8	60.0	73.5	57.2	67.1	70.8
	28	64.6	68.0	59.9	74.5	57.3	66.7	71.5

TABLE AII.508 (Contd)

Period	Date	Subject Code Number 8	9	10	11	12	13
P I	June 22	62.9	79.9	61.7	67.8	76.3	65.9
	23	63.1	80.4	61.7	68.7	76.8	66.4
	24	63.6	81.2	62.4	69.2	76.9	65.7
	25	63.7	81.6	62.1	69.7	76.8	66.6
	26	63.6	81.4	62.6	69.2	76.9	67.0
	27	63.6	81.4	62.3	69.3	77.1	67.1
	28	63.8	81.5	62.3	69.0	76.6	66.7
P II	29	63.8	81.4	62.4	69.1	76.9	67.0
	30	63.2	81.2	62.6	69.0	76.9	66.7
	July 1	63.3	81.3	62.3	69.0	76.8	66.8
	2	63.8	81.8	62.8	70.2	77.0	67.0
	3	63.2	81.3	62.7	69.7	76.7	67.0
	4	63.0	81.1	62.6	69.5	76.2	66.7
	5	63.6	81.0	62.9	69.7	76.7	66.6
EXP I	6	63.3	81.4	63.0	70.1	76.3	66.7
	7	62.1	79.5	62.1	69.0	75.3	65.3
	8	61.1	78.6	60.9	68.4	75.1	64.5
	9	61.0	78.4	60.0	67.9	74.2	63.4
	10	60.6	77.4	59.7	67.6	73.9	63.2
	11	60.4	77.1	59.2	67.0	73.7	62.8
	12	59.6	76.7	58.7	66.6	73.1	62.5
EXP II	13	59.9	76.4	59.0	66.7	72.9	62.8
	14	59.6	75.8	58.5	66.3	72.7	----
	15	59.5	75.2	57.8	66.2	73.0	----
	16	60.5	76.0	59.0	66.6	72.9	----
	17	60.9	76.7	60.0	67.1	73.8	----
	18	61.1	76.8	60.8	67.4	74.4	----
	19	61.7	78.5	62.6	69.0	76.4	----
REC I	20	61.5	78.6	62.8	69.2	76.0	----
	21	61.1	78.4	62.9	69.5	76.7	----
	22	61.6	78.8	62.6	69.7	76.3	----
	23	61.5	79.3	62.9	69.9	77.1	----
	24	61.6	79.9	62.4	69.7	77.6	----
	25	61.0	79.3	62.6	69.3	76.3	----
	26	61.5	80.6	63.2	70.0	77.4	----
REC II	27	62.1	80.7	64.0	70.0	77.4	----
	28	61.9	80.1	63.8	70.0	77.3	----

TABLE AII.508 (Contd)

Period	Date	14	15	16	17	18	19
		Subject Code Number					
P I	June 22	63.5	70.6	60.8	88.6	58.3	56.6
	23	64.5	71.8	61.4	89.2	59.0	57.3
	24	65.1	72.4	61.2	88.9	59.3	57.5
	25	64.8	72.6	61.7	89.2	59.2	57.4
	26	65.0	73.0	61.9	89.3	59.1	57.5
	27	65.0	73.0	61.6	89.2	59.3	57.4
	28	65.6	73.4	61.6	89.2	59.2	57.8
P II	29	65.8	73.2	61.8	88.8	59.4	57.5
	30	65.7	72.9	62.3	88.4	59.2	57.4
	July 1	65.7	72.6	61.8	----	59.2	57.5
	2	65.6	73.1	62.4	----	59.9	57.0
	3	67.8	73.3	62.0	----	58.6	57.7
	4	65.6	73.3	62.3	----	59.1	57.5
	5	66.1	73.3	62.3	----	59.1	57.4
EXP I	6	66.2	73.1	62.3	86.4	58.7	57.9
	7	64.5	72.2	61.7	85.4	57.9	56.9
	8	64.1	71.8	61.2	84.8	57.2	56.8
	9	63.3	71.2	61.0	84.0	56.8	57.1
	10	62.6	70.7	60.8	83.1	56.6	56.6
	11	62.5	70.7	60.5	82.6	55.8	56.9
	12	61.7	70.5	59.9	81.8	55.5	56.3
EXP II	13	61.9	70.9	----	82.0	55.7	55.4
	14	61.4	70.4	----	81.8	55.6	56.2
	15	61.4	70.0	----	81.9	54.9	55.8
	16	61.9	70.2	----	81.9	55.1	56.4
	17	63.4	70.6	----	81.9	56.0	57.1
	18	62.9	70.8	----	82.8	56.5	57.1
	19	65.5	70.1	----	83.3	58.2	57.4
REC I	20	65.4	----	----	83.1	58.7	57.6
	21	65.7	----	----	83.0	58.7	57.7
	22	65.8	----	----	83.4	58.6	57.6
	23	66.2	----	----	83.9	59.0	57.3
	24	66.9	----	----	84.0	60.0	56.4
	25	66.7	----	----	83.7	59.7	56.2
	26	67.2	----	----	83.8	60.3	----
REC II	27	67.0	----	----	84.8	59.9	----
	28	67.1	----	----	84.0	60.0	----

TABLE AII.508 (Contd)

Period	Date	20	21	22	90	91	92
		Subject Code Number					
P I	June 22	58.8	60.3	61.8	71.0	76.5	62.9
	23	59.0	61.3	62.7	71.4	76.5	63.4
	24	59.8	61.0	62.8	71.9	----	63.6
	25	59.5	60.8	62.8	72.1	76.8	63.6
	26	59.9	61.5	62.9	70.5	77.7	63.7
	27	59.2	60.8	62.6	72.4	77.1	62.9
	28	59.8	61.1	62.9	72.5	77.6	63.4
P II	29	59.5	60.8	62.7	72.2	77.4	63.3
	30	59.6	61.0	62.4	72.6	78.7	63.6
	July 1	60.0	60.6	62.5	72.8	78.0	63.7
	2	60.4	61.2	62.5	73.3	78.1	64.5
	3	60.3	60.9	61.8	73.1	77.3	63.7
	4	60.8	60.4	62.1	74.4	78.7	64.8
	5	60.4	60.6	62.4	74.0	78.4	64.5
EXP I	6	61.0	60.2	62.6	73.8	78.8	64.9
	7	60.1	59.7	62.2	73.4	78.8	65.5
	8	59.7	59.7	61.9	74.8	78.3	65.7
	9	57.2	59.7	61.7	74.5	79.0	65.3
	10	59.0	59.4	62.1	74.3	79.2	65.0
	11	58.8	59.6	62.0	74.8	79.4	65.8
	12	58.7	59.5	61.4	74.8	79.0	65.4
EXP II	13	59.1	60.0	61.8	74.2	78.6	64.8
	14	----	59.9	61.6	75.8	79.8	65.2
	15	----	60.1	61.7	75.6	79.4	65.6
	16	----	60.4	61.3	75.1	79.5	66.0
	17	----	60.2	61.4	76.4	79.5	66.1
	18	----	60.4	61.6	76.2	79.8	65.7
	19	----	60.8	62.5	75.6	80.2	65.7
REC I	20	----	60.8	62.3	76.4	79.7	65.5
	21	----	61.4	62.1	75.1	80.3	65.3
	22	----	61.4	62.8	74.8	79.7	65.0
	23	----	60.9	63.0	75.0	80.5	66.1
	24	----	61.7	62.9	75.8	80.4	66.0
	25	----	61.1	62.1	76.3	80.4	66.0
	26	----	61.2	63.2	75.9	----	66.5
REC II	27	----	61.2	63.1	75.2	80.6	65.8
	28	-----	61.7	63.1	75.0	----	66.8

TABLE AII.509

DAILY BODY WEIGHT: FLIGHT 2
(kg)

Period	Date	23	24	25	26	27	28	29
		Subject Code Number						
P I	June 22	78.2	51.8	66.4	52.9	51.5	63.2	73.5
	23	78.2	52.6	67.0	53.6	52.0	63.9	73.7
	24	78.1	53.4	67.4	53.9	52.4	64.2	74.3
	25	78.5	53.2	66.0	53.7	52.1	64.5	74.4
	26	78.5	52.7	67.3	53.6	52.7	65.0	74.4
	27	77.8	52.4	67.0	53.6	52.8	65.3	74.5
	28	78.0	52.2	67.2	54.0	52.9	65.3	75.0
P II	29	78.4	52.4	66.9	53.7	52.4	65.2	74.5
	30	77.9	52.5	67.0	53.2	52.5	65.3	75.0
	July 1	77.8	52.7	66.9	53.8	52.6	65.5	75.0
	2	77.3	52.7	66.4	54.1	53.3	65.4	74.9
	3	77.3	53.0	66.4	53.7	53.3	65.2	74.4
	4	77.2	52.4	66.0	53.5	52.5	65.1	74.3
	5	76.8	52.5	65.9	53.4	52.0	64.4	73.9
EXP I	6	77.3	52.8	66.7	53.7	52.9	64.9	74.8
	7	74.9	51.0	64.2	51.6	50.9	62.7	72.2
	8	73.6	49.8	63.3	50.3	50.0	61.8	71.4
	9	72.9	48.8	63.0	50.0	49.8	61.9	71.4
	10	71.8	48.2	61.9	49.5	49.6	61.3	70.8
	11	71.2	47.8	61.3	49.2	49.4	60.9	70.7
	12	68.2	47.3	60.7	49.0	49.0	61.0	70.5
EXP II	13	70.2	46.8	60.3	48.5	48.9	60.5	70.4
	14	69.4	46.4	59.6	48.2	48.3	59.9	69.6
	15	69.0	45.6	58.5	47.5	48.1	60.0	68.6
	16	70.4	46.7	59.4	48.4	49.3	60.8	70.7
	17	71.4	48.3	60.7	49.2	49.7	61.4	71.8
	18	72.2	50.0	61.1	48.6	49.8	61.4	72.2
	19	73.8	52.2	63.0	51.5	51.2	63.1	73.8
REC I	20	73.9	----	63.5	51.3	51.4	63.2	72.5
	21	74.4	----	63.6	52.0	51.4	63.7	73.2
	22	77.4	----	63.3	52.1	51.1	63.6	73.2
	23	76.0	----	64.6	53.0	51.5	64.5	73.9
	24	75.6	----	64.2	53.1	52.1	65.1	74.5
	25	74.4	----	63.9	52.4	50.8	64.7	74.2
	26	74.7	----	64.5	53.2	51.9	65.8	75.2
REC II	27	75.3	----	65.1	54.1	51.8	64.8	74.6
	28	75.3	----	65.5	54.4	51.8	64.9	75.5

TABLE AII.509 (Contd)

Period	Date	30	31	32	33	34	35	36
		Subject Code Number						
P I	June 22	----	82.5	60.8	64.2	59.8	61.6	61.7
	23	----	82.7	61.3	65.6	60.3	62.0	62.7
	24	----	82.2	61.7	66.3	61.0	62.6	63.8
	25	----	82.2	61.7	66.1	60.9	62.2	63.4
	26	----	82.6	61.6	65.7	60.2	62.5	63.8
	27	63.8	82.6	61.8	65.9	60.4	62.2	64.2
	28	64.7	83.1	62.3	65.4	60.6	62.9	63.1
P II	29	64.0	82.4	62.4	64.9	60.2	62.4	63.0
	30	64.4	82.3	62.7	65.5	60.3	62.6	63.6
	July 1	64.8	82.1	62.5	65.3	60.0	62.3	62.8
	2	64.6	82.6	62.6	65.6	60.2	62.3	63.8
	3	64.5	81.9	62.3	65.9	60.3	61.9	63.3
	4	64.7	82.2	62.3	65.4	59.5	61.9	63.2
	5	64.4	81.4	62.2	64.6	59.3	61.4	62.3
EXP I	6	64.4	81.9	62.3	64.9	60.0	62.2	63.4
	7	63.0	78.3	60.8	61.9	57.8	60.0	61.0
	8	62.1	77.3	59.1	60.7	57.1	58.8	59.8
	9	62.2	76.7	58.7	60.1	56.3	58.9	59.6
	10	61.9	74.6	57.9	----	56.3	58.2	59.2
	11	62.1	----	58.0	----	----	58.6	59.2
	12	62.1	77.0	58.7	60.8	57.3	59.1	59.1
EXP II	13	61.9	79.4	58.3	61.3	57.4	58.4	59.5
	14	61.5	79.4	57.8	60.3	57.0	58.1	59.2
	15	61.8	79.6	57.5	60.0	57.0	57.7	58.8
	16	62.4	79.0	58.5	62.6	58.0	58.5	59.9
	17	63.5	80.1	59.0	63.3	58.8	59.0	61.0
	18	64.4	81.0	59.0	63.8	59.0	59.9	61.6
	19	64.2	82.0	60.1	65.1	59.4	61.2	62.5
REC I	20	63.9	80.5	60.2	64.9	59.6	60.7	61.7
	21	63.6	81.8	60.3	64.4	59.4	60.8	62.3
	22	64.0	81.1	61.0	65.8	59.4	61.4	62.3
	23	64.4	82.6	61.6	65.7	60.0	61.3	63.5
	24	64.7	83.0	61.7	65.1	59.4	61.6	62.9
	25	64.2	81.9	61.1	65.9	59.6	60.9	62.2
	26	64.6	83.2	61.8	66.0	59.6	62.2	62.9
REC II	27	64.0	----	61.0	65.1	59.2	61.2	61.8
	28	64.9	81.5	61.2	66.1	59.0	61.7	61.8

TABLE AII.509 (Contd)

Period	Date	Subject Code Number 37	38	39	40	41	42
P I	June 22	62.3	67.4	60.0	66.4	59.8	64.8
	23	63.2	67.6	60.9	67.6	60.2	64.8
	24	62.9	67.8	61.1	67.5	61.0	65.4
	25	62.5	67.7	60.4	67.2	60.3	65.7
	26	62.3	68.3	60.3	67.2	60.6	65.9
	27	62.3	68.5	60.4	66.9	60.2	66.0
	28	62.3	67.8	----	67.0	60.4	66.1
P II	29	62.4	67.8	61.4	66.9	60.3	66.1
	30	62.1	67.6	61.4	66.8	60.5	66.0
	July 1	62.2	67.3	60.5	66.8	59.8	66.6
	2	62.5	67.8	60.6	----	59.8	66.6
	3	62.3	68.0	61.2	----	59.1	66.3
	4	62.5	67.6	61.3	----	59.2	66.3
	5	61.2	67.3	61.4	----	59.8	66.1
EXP I	6	62.9	67.9	61.5	----	60.6	66.2
	7	60.7	65.2	59.0	----	58.3	64.0
	8	59.7	63.9	57.7	----	----	63.0
	9	60.2	64.2	58.0	----	----	63.3
	10	60.3	63.6	57.5	----	----	62.8
	11	60.5	63.8	57.8	----	----	63.2
	12	60.8	64.0	57.9	67.2	----	63.3
EXP II	13	61.1	64.8	----	67.5	----	64.3
	14	60.7	64.0	----	67.5	----	63.2
	15	61.2	64.5	----	68.7	----	64.3
	16	62.1	65.3	----	68.8	----	64.2
	17	61.9	65.3	----	68.8	----	64.6
	18	61.6	65.4	----	69.2	----	65.1
	19	62.0	66.5	----	69.0	----	65.0
REC I	20	60.8	66.4	----	69.3	----	66.9
	21	62.1	66.8	----	69.6	59.2	68.2
	22	61.8	67.5	----	69.0	59.5	67.5
	23	61.8	68.2	----	69.5	60.1	67.2
	24	62.6	68.6	----	69.5	60.2	67.7
	25	62.3	68.4	----	69.7	59.5	67.0
	26	63.0	69.0	----	69.2	60.4	67.8
REC II	27	62.3	67.7	----	69.8	60.2	66.6
	28	62.7	68.2	----	70.3	60.7	66.7

TABLE AII.509 (Contd)

Period	Date	43	44	93	94	95	102
		Subject Code Number					
P I	June 22	63.2	63.2	63.6	78.3	76.8	----
	23	63.8	63.8	63.9	78.2	76.5	----
	24	63.6	64.3	64.3	78.8	76.9	----
	25	63.2	64.2	63.8	78.8	----	----
	26	63.1	64.5	64.0	78.8	77.7	----
	27	62.8	64.9	----	78.8	76.9	----
	28	63.1	63.4	----	79.5	77.7	----
P II	29	62.6	64.8	----	78.6	77.7	----
	30	62.7	64.7	----	78.8	77.7	----
	July 1	62.9	64.6	----	78.8	77.6	----
	2	63.0	65.1	----	80.0	77.4	----
	3	62.9	65.5	----	----	76.0	----
	4	62.8	65.9	----	79.5	76.3	----
	5	62.9	64.5	----	78.9	76.3	----
EXP I	6	63.3	64.9	----	78.7	77.4	----
	7	61.0	62.6	----	79.3	77.9	----
	8	60.8	62.1	----	79.7	77.7	----
	9	61.2	63.1	----	79.2	77.4	----
	10	60.9	62.7	----	79.8	76.7	----
	11	61.9	62.5	----	79.9	77.6	----
	12	61.9	62.5	----	79.8	78.1	61.6
EXP II	13	62.5	63.6	----	79.5	77.8	62.8
	14	62.2	62.4	----	80.6	78.1	63.2
	15	62.5	62.8	----	81.0	78.7	63.3
	16	62.5	62.7	----	80.2	78.1	63.1
	17	62.6	62.7	----	81.2	79.2	63.9
	18	62.8	63.2	----	81.0	78.4	64.1
	19	63.6	63.7	----	81.1	78.8	63.6
REC I	20	63.1	64.0	----	81.3	78.5	63.6
	21	63.3	63.8	----	81.0	78.6	63.8
	22	63.5	64.8	----	81.2	78.6	64.2
	23	64.2	64.8	----	81.6	78.5	65.4
	24	63.8	65.0	----	81.6	79.3	64.7
	25	63.4	64.2	----	82.7	79.1	65.1
	26	64.0	65.1	----	82.3	79.4	65.7
REC II	27	62.9	64.9	----	82.1	79.5	65.9
	28	63.9	65.0	----	83.0	79.0	65.8

TABLE AII.510

DAILY BODY WEIGHT: FLIGHT 3
(kg)

Period	Date	Subject Code Number 45	46	47	48	49	50	51
P I	June 22	64.1	75.9	68.2	76.0	61.9	58.5	77.0
	23	64.3	76.2	68.0	76.0	62.6	59.1	77.3
	24	64.9	76.5	68.9	76.6	63.1	59.3	78.2
	25	65.0	76.1	68.6	76.5	63.3	59.6	77.7
	26	65.2	76.0	68.6	77.0	63.6	60.0	78.0
	27	65.6	75.6	68.6	77.3	63.8	60.1	77.8
	28	65.2	74.8	68.5	76.7	63.1	59.6	77.6
P II	29	64.9	74.5	69.5	77.4	63.5	60.4	77.9
	30	65.0	73.8	69.1	77.2	63.6	60.6	76.9
	July 1	64.8	73.5	69.2	77.2	63.5	60.8	76.9
	2	65.2	72.8	69.6	77.4	63.6	60.5	77.0
	3	65.2	72.2	69.2	77.8	63.4	60.2	77.3
	4	65.0	71.2	68.6	77.2	63.7	59.8	76.6
	5	65.3	72.2	69.0	77.6	63.8	59.6	76.3
EXP I	6	65.7	72.9	69.1	77.8	63.8	60.0	76.7
	7	64.1	71.5	67.6	75.5	62.3	59.0	76.0
	8	62.6	70.6	67.2	74.3	61.6	58.3	75.2
	9	61.9	69.5	66.2	73.5	60.8	57.8	74.8
	10	61.1	68.6	65.7	72.6	60.7	57.7	74.6
	11	60.3	67.9	65.4	72.0	60.3	57.0	74.2
	12	59.5	67.2	65.5	71.4	59.6	56.4	73.6
EXP II	13	59.3	66.8	63.7	70.9	59.7	56.1	73.6
	14	59.9	66.4	63.6	69.8	59.1	56.0	73.3
	15	58.4	65.9	62.9	69.5	58.7	55.9	73.2
	16	59.0	66.4	63.7	70.5	59.7	56.8	73.8
	17	60.3	68.0	64.0	70.9	60.4	57.8	74.8
	18	61.0	69.5	65.7	72.1	60.1	58.0	74.8
	19	63.3	71.1	67.2	73.9	61.9	59.2	76.0
REC I	20	----	73.0	67.1	75.0	62.1	59.5	75.9
	21	62.4	72.0	65.9	74.0	61.8	58.7	76.2
	22	63.0	73.0	66.4	75.2	61.9	58.9	75.8
	23	63.6	74.0	67.2	75.8	62.1	59.8	75.8
	24	64.4	73.2	67.2	75.8	62.8	59.6	75.4
	25	63.4	74.0	67.2	76.7	62.4	60.0	75.8
	26	64.4	72.5	66.9	77.1	63.1	60.6	76.0
REC II	27	64.5	72.7	66.8	76.4	63.4	60.4	76.7
	28	65.0	73.8	67.3	77.3	63.4	60.1	77.8

TABLE AII.510 (Contd)

Period	Date	52	53	54	55	56	57
		Subject Code Number					
P I	June 22	67.4	63.5	64.6	55.4	64.1	70.7
	23	67.7	63.7	64.8	56.1	65.2	71.1
	24	67.8	64.5	65.3	55.8	65.5	71.4
	25	67.4	63.8	65.1	55.7	65.9	71.3
	26	67.6	64.0	65.3	56.1	65.6	70.8
	27	68.1	64.3	65.4	56.1	65.8	70.7
	28	68.0	64.2	65.2	56.6	65.5	70.6
P II	29	68.9	63.8	65.3	56.3	66.1	70.7
	30	68.2	63.8	65.0	56.0	66.3	71.1
	July 1	68.2	64.0	65.1	56.2	66.8	71.2
	2	68.3	63.6	65.7	56.3	67.7	71.6
	3	69.0	63.9	65.2	56.6	67.4	71.6
	4	68.3	63.3	65.6	56.3	67.1	71.2
	5	68.0	63.3	65.1	56.0	67.4	71.9
EXP I	6	67.2	63.6	65.7	56.6	67.8	71.8
	7	67.1	62.5	64.0	55.4	65.8	70.5
	8	66.7	62.1	62.8	55.1	65.1	69.8
	9	66.7	61.8	62.1	55.0	64.4	69.0
	10	66.8	61.5	61.7	55.0	64.2	68.6
	11	66.8	59.7	60.9	54.9	63.9	68.2
	12	66.0	60.9	59.9	54.6	63.7	67.6
EXP II	13	65.3	60.5	59.9	54.7	63.6	67.6
	14	----	59.9	59.3	53.9	63.2	67.2
	15	----	59.9	58.7	53.7	63.0	67.1
	16	----	60.6	59.3	54.7	63.8	67.0
	17	67.1	60.4	60.4	55.4	64.6	67.7
	18	----	61.7	61.4	55.8	65.1	68.0
	19	67.9	61.7	63.9	56.9	67.6	70.0
REC I	20	68.2	62.1	64.6	57.6	68.7	70.5
	21	67.7	61.7	63.3	56.9	67.2	69.5
	22	68.3	62.3	63.5	57.1	67.8	70.1
	23	69.0	62.4	63.9	57.6	68.8	70.3
	24	69.2	62.0	64.9	57.4	69.0	70.4
	25	68.7	62.1	65.1	57.4	69.8	71.5
	26	68.6	62.6	65.1	58.0	69.0	71.0
REC II	27	68.5	62.6	64.8	57.9	68.4	71.3
	28	69.4	63.2	65.6	58.1	68.1	72.0

TABLE AII.510 (Contd)

Period	Date	58	59	60	61	62	63
		Subject Code Number					
P I	June 22	66.9	----	78.6	67.3	68.5	72.7
	23	67.5	----	79.6	68.4	70.1	73.9
	24	68.0	----	78.8	68.9	70.0	74.5
	25	68.3	----	78.0	68.8	69.6	74.2
	26	68.3	----	78.1	69.3	70.8	73.9
	27	68.4	----	78.2	68.6	70.1	74.1
	28	68.2	----	77.6	69.3	70.8	73.8
P II	29	67.7	----	78.0	69.6	70.8	73.8
	30	67.0	----	78.1	69.3	70.3	73.3
	July 1	66.6	----	77.7	68.9	70.9	73.7
	2	65.8	----	77.7	69.6	71.3	73.7
	3	65.8	----	77.8	70.2	71.3	74.6
	4	----	----	77.1	69.9	70.5	74.8
	5	----	----	77.3	69.6	70.9	73.6
EXP I	6	----	----	77.3	69.7	71.2	74.5
	7	----	67.0	76.8	68.2	69.6	73.0
	8	----	66.5	76.2	67.4	69.0	72.4
	9	----	66.2	75.8	66.9	68.4	72.5
	10	----	66.1	75.8	66.8	68.2	72.2
	11	----	64.3	75.6	66.5	67.9	71.8
	12	64.0	65.7	75.0	66.1	67.5	71.4
EXP II	13	65.4	65.5	75.2	65.9	67.1	71.6
	14	65.5	65.3	75.0	65.7	66.7	71.6
	15	65.6	65.2	74.7	65.2	66.0	71.2
	16	65.5	65.4	74.7	65.3	66.5	71.4
	17	65.4	66.2	75.1	65.9	67.0	71.3
	18	65.7	66.4	75.7	66.0	67.2	72.1
	19	65.4	67.2	75.4	68.3	68.7	73.7
REC I	20	65.7	68.2	76.5	68.8	69.4	73.6
	21	65.2	66.8	75.5	67.9	69.0	73.8
	22	65.7	67.2	76.3	68.6	----	75.1
	23	66.6	68.2	77.0	69.1	----	76.3
	24	66.0	68.0	76.3	68.7	----	74.9
	25	66.6	69.0	76.2	68.7	----	74.1
	26	66.3	68.8	----	68.7	----	74.8
REC II	27	66.1	68.3	77.8	69.3	68.8	76.3
	28	65.9	68.7	77.2	68.6	69.7	75.2

TABLE AII.510 (Contd)

Period	Date	64	65	66	96	97	98
		Subject Code Number					
P I	June 22	75.1	72.4	72.6	82.8	78.0	64.2
	23	75.9	74.2	73.1	84.1	77.5	64.2
	24	76.2	75.1	73.4	83.8	77.4	63.6
	25	75.6	75.4	73.7	84.3	78.0	65.2
	26	76.4	74.2	74.3	84.1	77.4	64.5
	27	76.8	75.8	74.2	84.6	77.3	65.4
	28	76.2	74.8	73.9	84.3	76.7	64.4
P II	29	76.5	74.8	73.9	84.2	76.7	64.6
	30	76.9	74.7	74.2	84.1	76.9	65.0
	July 1	77.0	75.7	74.6	84.2	76.2	65.2
	2	77.4	75.6	75.0	83.1	76.5	65.2
	3	77.6	75.6	74.7	83.6	76.7	64.5
	4	77.1	74.9	74.6	83.8	76.1	65.1
	5	77.6	75.1	74.4	84.3	76.9	65.6
EXP I	6	77.7	76.2	74.8	84.2	76.7	65.2
	7	75.9	74.9	73.9	84.5	77.1	65.9
	8	75.3	74.5	73.4	85.5	77.5	66.5
	9	75.3	74.2	73.6	84.0	76.9	65.6
	10	75.6	74.7	73.7	84.6	76.9	65.6
	11	75.2	74.4	73.5	85.5	77.9	66.2
	12	74.7	74.0	73.0	85.8	77.4	65.4
EXP II	13	74.8	74.1	73.3	85.3	76.7	65.2
	14	74.7	73.8	73.3	86.1	76.9	65.6
	15	74.3	73.6	72.6	86.0	76.9	66.0
	16	74.1	73.5	72.5	85.4	76.3	65.8
	17	74.8	73.8	72.9	86.3	76.9	66.1
	18	74.4	74.0	73.0	86.1	77.2	65.9
	19	75.2	76.1	74.2	86.6	77.4	67.5
REC I	20	75.6	76.3	75.0	86.3	77.4	67.4
	21	75.2	74.6	74.1	85.0	76.6	66.2
	22	76.2	75.4	74.4	85.5	76.3	66.2
	23	77.1	76.3	74.9	85.4	77.0	67.4
	24	76.9	75.4	74.6	85.8	77.0	67.4
	25	77.0	75.1	73.5	86.2	77.3	----
	26	76.0	75.4	75.1	85.2	76.9	----
REC II	27	76.1	76.2	74.8	85.5	76.5	66.4
	28	76.4	75.7	75.0	85.6	76.4	66.8

TABLE AII.511

DAILY BODY WEIGHT: FLIGHT 4
(kg)

Period	Date	67	68	69	70	71	72	73
		Subject Code Number						
P I	June 22	59.6	65.5	67.8	65.3	61.3	69.0	59.1
	23	60.4	66.5	66.3	66.2	62.1	69.7	60.2
	24	60.8	66.7	66.3	67.1	62.5	69.2	60.3
	25	60.9	66.4	65.8	66.4	62.5	69.0	60.1
	26	61.3	66.3	66.1	67.8	62.9	69.1	60.0
	27	61.4	66.4	65.5	67.7	63.0	69.6	60.5
	28	61.5	66.9	64.5	67.2	63.0	69.9	59.3
P II	29	61.0	66.9	66.5	67.2	62.8	68.9	60.3
	30	61.1	67.0	66.1	67.1	62.7	68.6	59.8
	July 1	61.8	67.1	66.8	67.0	62.9	69.0	59.9
	2	61.6	67.0	66.6	67.1	62.8	69.3	60.0
	3	61.7	66.9	66.6	67.5	63.1	69.0	59.6
	4	61.2	66.4	66.4	66.9	62.8	68.6	59.8
	5	61.6	66.9	66.5	67.7	62.9	69.0	59.9
EXP I	6	61.4	67.2	66.6	67.7	63.3	69.2	60.2
	7	59.5	65.1	64.5	65.1	61.6	67.1	58.6
	8	58.6	64.0	63.8	63.8	60.8	66.4	58.1
	9	58.1	63.3	63.2	63.2	60.3	66.6	58.2
	10	57.4	63.2	62.8	62.8	60.2	66.0	----
	11	56.8	62.5	62.5	62.5	60.4	65.9	58.2
	12	56.3	62.1	62.2	61.7	60.4	65.4	57.7
EXP II	13	55.8	----	61.4	----	59.5	65.5	57.7
	14	55.2	----	61.0	----	59.0	65.0	57.4
	15	54.5	61.7	60.7	61.5	58.8	64.4	57.3
	16	54.9	63.2	61.3	62.8	59.5	65.3	----
	17	57.2	64.1	62.7	63.6	60.6	66.0	----
	18	58.5	64.0	63.2	63.6	61.0	66.0	----
	19	60.7	66.2	65.2	65.2	62.3	67.3	----
REC I	20	62.3	66.8	66.0	65.8	62.8	68.1	----
	21	61.1	66.3	64.5	65.1	61.5	67.4	----
	22	61.7	66.2	66.0	66.2	62.2	68.4	----
	23	61.7	----	66.0	66.2	63.3	69.5	----
	24	62.0	----	66.2	66.9	63.8	69.2	----
	25	61.8	----	66.0	66.3	64.1	69.2	----
	26	61.5	----	66.1	66.3	64.3	69.0	----
REC II	27	62.1	----	66.3	66.5	64.0	69.0	----
	28	62.4	----	67.1	68.0	65.0	70.2	----

TABLE AII.511 (Contd)

Period	Date	Subject Code Number 74	75	76	77	78	79
P I	June 22	70.8	69.9	55.5	65.0	69.7	65.3
	23	71.9	70.6	56.6	64.9	70.6	66.4
	24	72.9	70.5	56.8	64.7	70.6	66.2
	25	72.1	70.2	56.2	63.5	70.0	66.0
	26	72.0	69.8	56.2	63.7	69.6	66.3
	27	72.1	70.6	56.0	63.5	70.4	66.3
	28	70.9	70.6	56.5	63.9	70.4	66.1
P II	29	70.2	70.8	56.4	64.1	70.4	66.5
	30	70.1	70.3	56.2	64.0	70.6	65.9
	July 1	70.2	70.8	55.9	64.2	70.4	65.8
	2	69.6	70.4	56.6	64.0	70.4	65.6
	3	69.5	70.8	56.5	64.2	70.6	65.8
	4	68.3	70.5	55.8	64.0	70.4	65.8
	5	68.1	70.6	56.4	64.3	71.0	65.4
EXP I	6	69.0	70.2	56.8	64.6	71.2	66.2
	7	66.8	68.0	54.6	62.6	68.9	64.2
	8	66.0	66.9	53.3	----	67.4	63.3
	9	----	66.6	----	----	66.9	63.4
	10	67.1	66.4	----	----	66.2	63.0
	11	67.0	66.8	53.4	----	67.3	63.6
	12	66.4	66.4	53.1	----	67.1	62.8
EXP II	13	66.3	66.1	52.9	----	67.4	61.9
	14	66.1	65.7	52.6	----	66.8	61.6
	15	66.1	65.5	52.4	----	67.3	61.6
	16	67.2	66.6	53.0	----	68.5	62.1
	17	68.9	67.0	53.1	----	69.8	62.2
	18	68.7	66.8	53.9	----	70.0	62.4
	19	70.1	69.7	55.8	----	71.5	64.4
REC I	20	70.4	69.2	56.2	----	73.5	64.5
	21	71.2	68.9	55.2	----	71.3	63.3
	22	69.0	70.1	55.9	----	72.3	64.3
	23	70.0	70.3	55.6	----	72.6	64.4
	24	70.5	69.7	55.8	----	73.0	64.8
	25	69.4	69.7	56.0	----	72.9	64.0
	26	69.8	70.1	55.8	----	72.4	65.0
REC II	27	69.4	69.1	56.1	----	71.6	65.3
	28	68.6	70.0	56.6	----	----	66.2

TABLE AII.511 (Contd)

Period	Date	80	81	82	83	84	85
		Subject Code Number					
P I	June 22	61.2	66.6	59.7	63.5	62.8	68.2
	23	62.8	67.3	61.0	64.7	63.5	69.3
	24	62.8	67.4	60.9	65.0	63.8	69.4
	25	62.7	67.1	61.1	64.6	63.9	69.2
	26	62.8	67.0	60.7	64.6	64.1	70.1
	27	63.0	67.5	60.7	65.1	64.0	71.0
	28	62.7	67.0	----	64.7	63.9	69.6
P II	29	63.2	67.3	----	65.1	64.2	69.8
	30	62.4	67.2	----	65.3	64.5	69.6
	July 1	62.7	67.0	----	65.3	64.2	69.9
	2	63.0	67.2	59.9	65.5	64.4	69.9
	3	63.3	67.4	60.8	65.3	64.3	69.5
	4	63.0	67.5	60.4	65.1	64.2	68.8
	5	62.8	67.5	60.5	65.3	63.5	68.6
EXP I	6	63.4	67.9	60.3	65.8	64.4	69.2
	7	61.6	65.9	58.6	63.5	62.3	67.0
	8	60.5	64.9	57.8	62.5	61.0	65.7
	9	60.4	64.9	58.2	62.6	61.1	65.8
	10	60.1	65.0	58.2	62.6	61.1	65.5
	11	60.8	65.7	58.5	62.8	61.1	---
	12	60.3	65.7	58.0	62.8	61.0	67.0
EXP II	13	60.4	66.0	57.6	62.3	60.9	67.1
	14	59.5	65.9	56.9	61.5	59.9	66.3
	15	59.8	66.2	----	61.7	60.7	66.5
	16	59.9	66.4	----	61.8	61.1	67.9
	17	60.3	66.2	----	61.9	61.0	68.3
	18	61.1	66.4	----	62.8	61.0	68.1
	19	62.1	67.6	----	64.4	62.4	69.3
REC I	20	62.7	67.4	----	65.4	63.0	69.8
	21	61.6	66.7	60.0	64.2	62.4	68.5
	22	62.1	65.8	60.4	64.8	63.6	69.3
	23	62.2	66.5	61.5	65.8	63.8	69.2
	24	62.7	67.4	60.8	66.1	63.9	69.4
	25	62.5	66.8	61.0	65.8	64.9	69.5
	26	62.1	67.3	61.0	65.3	64.4	69.4
REC II	27	62.8	67.8	61.4	66.1	64.5	69.0
	28	62.5	68.1	60.9	66.6	64.9	68.6

TABLE AII.511 (Contd)

Period	Date	Subject Code Number 86	87	88	99	100	101
P I	June 22	----	86.8	----	65.3	85.0	65.0
	23	----	87.5	65.7	65.5	84.8	65.2
	24	61.7	88.1	66.0	65.1	84.8	65.2
	25	61.9	88.0	66.0	65.2	84.8	65.1
	26	62.3	88.0	66.0	65.8	84.4	64.9
	27	61.7	88.3	66.3	66.7	84.5	65.1
	28	61.7	87.6	66.0	66.2	83.9	65.3
P II	29	62.1	88.5	66.0	67.1	84.5	65.9
	30	61.9	88.4	65.8	66.4	84.7	65.8
	July 1	62.1	88.7	66.6	66.1	84.7	65.9
	2	62.0	88.8	66.6	66.5	84.5	65.9
	3	61.9	88.7	66.7	66.8	85.0	66.0
	4	61.4	88.1	66.2	66.8	84.8	66.5
	5	62.1	87.8	66.5	67.3	84.7	65.9
EXP I	6	62.6	88.7	66.4	67.2	85.0	66.0
	7	60.4	86.0	64.4	67.0	85.0	66.3
	8	59.8	84.6	63.6	67.3	85.5	66.6
	9	60.1	----	----	67.2	84.6	66.1
	10	60.0	----	----	68.1	84.5	65.9
	11	60.5	----	----	68.6	85.6	66.5
	12	60.4	86.3	----	67.9	83.6	65.9
EXP II	13	60.7	87.2	----	67.8	84.5	65.7
	14	60.1	88.1	----	67.9	84.5	65.9
	15	60.3	----	----	68.6	84.6	66.4
	16	60.8	----	----	68.0	84.1	----
	17	60.9	----	----	68.3	84.6	66.5
	18	61.0	----	----	68.3	85.0	66.2
	19	62.0	----	----	68.6	84.7	66.7
REC I	20	62.5	----	----	68.6	85.3	66.2
	21	61.6	89.1	----	67.6	83.9	65.7
	22	62.6	89.1	----	68.0	84.9	66.1
	23	62.7	90.0	----	68.0	84.8	66.4
	24	----	89.4	----	68.0	85.3	66.6
	25	63.5	----	----	68.3	86.0	66.7
	26	63.3	88.0	----	68.1	85.3	66.6
REC II	27	63.3	88.4	----	68.2	85.4	65.8
	28	63.3	89.0	----	69.2	85.8	67.4

TABLE AII.512

FECAL CALCIUM (WINTER 1954): FLIGHT 1
(mg/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	437	507	---	---	---	580
2	378	480	240	240	593	610
3	500	437	68	25	888	1066
4	795	438	27	---	---	1723
5	595	494	224	224	836	1681
6	604	438	83	785	979	1275
7	688	283	178	178	1243	1749
8	813	---	---	520	1284	1480
9	497	710	149	567	1034	2099
10	565	565	218	63	872	1714
11	578	508	98	98	1161	1386
12	418	401	288	130	443	1229
13	914	906	232	244	1392	1165
14	584	338	249	249	574	1007
15	1003	1021	229	193	1332	1633
16	1097	---	---	351	1147	1472
17	453	282	22	62	1046	1443
18	1377	555	269	269	1120	2066
19	506	290	276	276	1262	1736
20	503	433	140	95	1340	1861
21	843	557	114	140	804	858
22	1066	787	385	457	736	1793

TABLE AII.513

FECAL CALCIUM (WINTER 1954): FLIGHT 2
(mg/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	1124	1160	172	172	1111	1194
24	1160	831	76	76	1064	1153
25	443	442	46	46	1261	1318
26	669	806	53	53	805	1392
27	1526	982	92	92	1264	1569
28	880	625	75	75	1147	1083
29	867	697	149	138	1182	1743
30	1074	853	281	281	826	1479
31	778	1176	128	128	958	1545
32	818	554	191	191	1485	1267
33	303	405	144	638	1372	1425
34	619	458	189	189	632	1598

TABLE AII.513 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
35	678	84	59	59	944	944
36	735	348	278	205	821	1215
37	822	840	130	130	1230	1347
38	531	605	134	134	1701	1913
39	1068	469	131	131	482	1012
40	1127	894	81	81	820	1414
41	1326	543	199	219	1129	1191
42	543	---	100	100	933	2441
43	855	1069	193	319	730	1859
44	621	611	278	545	604	2016

TABLE AII.514

FECAL CALCIUM (WINTER 1954): FLIGHT 3
(mg/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	487	487	258	258	726	1894
46	221	154	63	63	711	2184
47	565	175	0	---	---	946
48	299	196	72	72	637	1452
49	524	312	124	124	684	921
50	606	560	75	97	692	1315
51	1051	1037	47	47	1131	1954
52	1055	900	249	249	782	1956
53	1070	775	289	289	885	1506
54	983	224	64	364	823	1354
55	766	350	120	475	1574	1574
56	455	390	150	142	1135	1274
57	752	855	456	385	752	1414
58	956	506	48	48	1354	1622
59	934	937	445	137	1482	1157
60	673	743	181	---	---	1709
61	---	---	232	275	797	1214
62	713	413	153	377	1237	1864
63	514	275	148	78	439	905
64	731	601	302	139	623	1546
65	796	475	375	285	1325	1444
66	330	968	305	305	1839	1504

TABLE AII.515

FECAL CALCIUM (WINTER 1954): FLIGHT 4
(mg/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
68	393	437	92	---	---	1227
69	597	782	205	205	1521	1626
70	929	929	17	17	486	1145
71	434	638	98	98	595	1276
72	311	370	99	99	498	977
73	1124	762	169	320	874	1754
74	757	819	235	52	132	1127
75	877	513	105	105	1681	1681
76	760	574	195	195	508	1412
77	470	181	360	360	360	2334
78	604	415	152	152	433	726
79	1021	749	257	257	614	637
80	703	315	214	214	811	1135
81	650	379	127	127	622	1434
82	681	441	142	142	265	609
83	544	356	195	195	750	1242
84	815	998	142	142	527	1387
85	617	906	150	150	534	1573
86	606	411	269	269	855	1337
87	473	680	348	348	694	1313
88	265	265	350	350	730	693

TABLE AII.516

CALCIUM BALANCE (WINTER 1954): FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	+0.19	-0.02	-----	-----	-----	+1.41
2	+0.21	+0.12	-0.29	-0.29	+0.67	+1.69
3	+0.03	-0.22	-0.16	-0.06	-0.16	+1.22
4	-0.22	+0.07	-0.07	-----	-----	+0.68
5	+0.03	+0.03	-0.31	-0.28	+1.31	+0.62
6	-0.11	-0.25	-0.20	-0.89	+0.23	+0.84
7	-0.18	+0.14	-0.28	-0.24	+0.10	+0.64
8	-0.26	-----	-----	-0.59	-0.21	+0.87
9	-0.20	+0.37	-0.23	-0.65	+0.13	+0.35
10	-0.15	-0.11	-0.28	-0.11	+0.32	+0.85
11	+0.11	+0.20	-0.09	-0.09	+0.16	+0.80
12	-0.13	-0.08	-0.41	-0.26	+0.22	+0.64

TABLE AII.516 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
13	+0.23	+0.18	-0.25	-0.27	+0.03	+0.98
14	+0.28	+0.20	-0.28	-0.27	+0.44	+1.40
15	-0.22	-0.38	-0.23	-0.21	+0.18	+0.53
16	-0.12	-----	-----	-0.37	0.00	+0.67
17	+0.08	+0.09	-0.02	-0.07	+0.25	+0.80
18	-0.83	-0.02	-0.26	-0.23	-0.22	+0.22
19	+0.05	+0.17	-0.25	-0.23	-0.41	+0.23
20	-0.27	-0.13	-0.08	-0.03	0.00	+0.27
21	-0.03	-0.04	+0.03	+0.03	-0.12	+1.07
22	-0.22	-0.16	-0.20	-0.27	+0.08	-0.02

TABLE AII.517

CALCIUM BALANCE (WINTER 1954): FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	+0.44	+0.32	-0.29	-0.25	+0.46	+1.24
24	-0.17	+0.18	-0.13	-0.12	+0.10	+1.21
25	-0.19	-0.18	-0.12	-0.11	-0.68	+0.86
26	+0.13	+0.37	-0.08	-0.08	+0.35	+0.91
27	-0.10	+0.47	-0.12	-0.11	+0.04	+0.62
28	-0.14	+0.02	-0.20	-0.11	+0.13	+0.64
29	+0.07	-0.07	-0.21	-0.39	-0.37	+0.14
30	-0.19	-0.10	-0.34	-0.33	+0.06	+0.22
31	+0.21	-0.11	-0.24	-0.23	+0.25	+0.32
32	+0.20	+0.61	-0.26	-0.25	-0.40	+1.00
33	-0.04	-0.17	-0.18	-0.66	-0.13	+0.73
34	-0.24	-0.06	-0.25	-0.23	+0.48	+0.72
35	-0.32	+0.19	-0.17	-0.15	-0.43	+1.21
36	-0.03	+0.17	-0.34	-0.27	+0.07	+0.98
37	-0.09	-0.10	-0.16	-0.13	-0.27	+0.73
38	-0.22	-0.25	-0.13	-0.10	-0.69	+0.42
39	-0.42	+0.17	-0.06	-0.06	+0.68	+1.34
40	-0.08	-0.23	-0.03	-0.02	+0.69	+0.77
41	-0.94	-0.12	-0.13	-0.12	+0.22	+0.88
42	-0.36	-----	-0.01	-0.01	-0.11	-0.07
43	+0.39	+0.38	+0.01	-0.12	+0.12	+0.25
44	-0.06	+0.07	-0.11	-0.39	+0.24	-0.01

TABLE AII.518

CALCIUM BALANCE (WINTER 1954): FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	-0.22	-0.22	-0.56	-0.30	+0.01	+0.32
46	-0.04	-0.01	-0.21	-0.15	+0.06	+0.01
47	-0.31	-0.04	-0.06	-----	-----	+1.12
48	-0.14	-0.12	-0.12	-0.06	-0.18	+0.67
49	-0.36	-0.21	-0.20	-0.16	-0.14	+0.93
50	-0.32	-0.38	-0.11	-0.12	-0.07	+0.68
51	-0.05	+0.02	-0.10	-0.07	+0.18	+0.21
52	+0.14	0.00	-0.29	-0.28	+0.28	+0.36
53	+0.18	-0.02	-0.35	-0.35	+0.54	+0.63
54	-0.31	+0.31	-0.18	-0.44	+0.26	+1.18
55	-0.28	+0.20	-0.17	-0.52	-0.86	+0.35
56	-0.22	-0.12	-0.20	-0.22	-0.06	+0.60
57	-0.27	-0.72	-0.56	-0.39	+0.32	+0.83
58	-0.42	+0.18	-0.08	-0.06	-0.32	+0.60
59	-0.42	+0.22	-0.52	-0.21	+0.29	+1.22
60	+0.03	+0.02	-0.18	-----	-----	+0.64
61	-----	-----	-0.30	-0.38	-0.18	+0.43
62	-0.21	+0.16	-0.10	-0.29	-0.28	+0.56
63	-0.29	-0.07	-0.15	-0.04	-0.13	+0.17
64	-0.41	+0.02	-0.27	-0.09	+0.56	+1.10
65	-0.35	+0.02	-0.30	-0.18	-0.09	+0.60
66	-0.29	-0.12	-0.14	-0.14	-0.20	+1.15

TABLE AII.519

CALCIUM BALANCE (WINTER 1954): FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
68	-0.05	+0.11	-0.18	-----	-----	+0.84
69	-0.16	-0.28	-0.34	-0.31	-0.52	+0.36
70	-0.62	-0.56	-0.15	-0.14	+0.20	+0.81
71	-0.23	-0.35	-0.22	-0.19	-0.32	+0.67
72	-0.16	-0.18	-0.16	-0.15	+0.08	+1.20
73	-0.55	-0.01	-0.20	-0.35	0.00	+0.25
74	-0.14	+0.13	-0.35	-0.11	+0.60	+1.04
75	-0.25	+0.08	-0.15	-0.15	-0.69	+0.53
76	-0.13	0.00	-0.23	-0.24	+0.51	+0.72
77	-0.15	+0.16	-0.35	-0.35	+0.83	-0.23
78	+0.46	+0.40	-0.15	-0.14	+0.81	+1.39

TABLE AII.519 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
79	-0.34	-0.14	-0.32	-0.32	+0.23	+1.37
80	-0.43	+0.23	-0.28	-0.30	+0.03	+0.95
81	0.00	+0.34	-0.16	-0.17	+0.61	+0.79
82	-0.08	+0.17	-0.13	-0.18	+0.84	+1.54
83	-0.04	+0.17	-0.19	-0.17	+0.17	+0.68
84	-0.23	-0.40	-0.08	-0.07	+0.73	+0.66
85	-0.13	-0.25	-0.03	-0.04	+0.20	+0.67
86	-0.18	+0.13	-0.20	-0.17	+0.04	+0.56
87	-0.01	-0.10	-0.24	-0.22	+0.06	+0.49
88	+0.56	+0.68	-0.15	+0.35	+0.35	+1.38

TABLE AII.520

FECAL PHOSPHORUS (WINTER 1954): FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	0.52	0.32	----	----	----	0.38
2	0.18	0.27	0.16	0.16	0.68	0.32
3	0.53	0.32	0.09	0.09	1.11	0.68
4	0.68	0.28	0.02	----	----	0.93
5	0.44	0.26	0.13	0.13	0.68	1.02
6	0.40	0.35	0.09	0.42	0.81	0.62
7	0.44	0.14	0.09	0.09	0.86	0.73
8	0.56	----	----	0.28	0.97	0.65
9	0.24	0.40	0.08	0.25	0.76	1.06
10	0.42	0.34	0.18	0.16	0.86	1.31
11	0.44	0.39	0.08	0.08	0.82	0.77
12	0.36	0.29	0.21	0.14	0.31	0.64
13	0.74	0.64	0.15	0.06	1.03	0.60
14	0.48	0.23	0.21	0.21	0.61	0.52
15	0.73	0.46	0.20	0.19	0.82	0.81
16	0.66	----	----	0.20	0.65	0.57
17	0.45	0.27	0.11	0.14	0.74	0.79
18	0.59	0.24	0.19	0.19	0.71	1.10
19	0.50	0.24	0.21	0.21	0.97	0.96
20	0.26	0.32	0.16	0.15	0.92	0.98
21	0.45	0.34	0.22	0.16	0.47	0.45
22	0.50	0.42	0.31	0.35	0.38	0.86

TABLE AII.521

FECAL PHOSPHORUS (WINTER 1954): FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	0.61	0.56	0.10	0.10	0.79	0.66
24	0.94	0.64	0.06	0.06	0.92	0.68
25	0.24	0.27	0.03	0.03	1.10	0.63
26	0.66	0.27	0.02	0.02	0.85	0.75
27	1.19	0.70	0.07	0.07	0.95	0.86
28	0.56	0.44	0.05	0.05	0.79	0.55
29	0.50	0.22	0.14	0.13	0.99	1.07
30	0.58	0.42	0.20	0.20	0.50	0.55
31	0.41	0.57	0.11	0.11	0.77	0.71
32	0.68	0.34	0.12	0.12	1.39	0.72
33	0.28	0.25	0.19	0.13	0.95	0.73
34	0.41	0.24	0.13	0.13	0.44	0.94
35	0.42	0.09	0.06	0.06	0.66	0.66
36	0.47	0.17	0.13	0.16	0.65	0.84
37	0.65	0.58	0.10	0.10	0.92	0.69
38	0.44	0.46	0.12	0.12	1.34	0.94
39	0.58	0.26	0.07	0.07	0.35	0.47
40	0.59	0.46	0.08	0.08	0.69	0.72
41	0.85	0.34	0.21	0.20	1.24	0.91
42	-----	-----	0.10	0.11	0.67	1.08
43	0.71	0.67	0.29	0.34	0.45	0.90
44	0.46	0.50	0.29	0.57	0.65	1.26

TABLE AII.522

FECAL PHOSPHORUS (WINTER 1954): FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	0.42	0.42	0.34	0.34	0.69	1.44
46	0.23	0.16	0.06	0.06	0.54	1.24
47	0.39	0.15	0.00	-----	-----	0.41
48	0.35	0.26	0.13	0.13	0.70	0.81
49	0.36	0.37	0.10	0.10	0.44	0.35
50	0.40	0.34	0.11	0.13	0.46	0.78
51	0.47	0.54	0.05	0.05	0.57	0.96
52	0.56	0.48	0.16	0.16	0.53	0.94
53	0.80	0.55	0.24	0.24	0.77	0.88
54	0.61	0.11	0.03	0.27	0.37	0.71
55	0.48	0.22	0.07	0.50	0.74	0.74

TABLE AII.522 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
56	0.37	0.38	0.16	0.15	0.71	0.52
57	0.47	0.56	0.35	0.29	0.56	0.73
58	0.46	0.26	0.02	0.02	0.81	0.87
59	0.59	0.57	0.24	0.13	1.12	0.56
60	0.41	0.50	0.23	----	----	0.98
61	----	----	0.11	0.18	0.74	0.72
62	0.36	0.27	0.22	0.32	0.83	1.21
63	0.36	0.21	0.21	0.15	0.24	0.43
64	0.56	0.39	0.28	0.18	0.46	0.75
65	0.50	0.31	0.35	0.25	0.95	0.69
66	0.20	0.59	0.23	0.23	1.25	0.80

TABLE AII.523

FECAL PHOSPHORUS (WINTER 1954): FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
68	0.28	0.24	0.05	----	----	0.78
69	0.35	0.44	0.14	0.14	1.14	0.78
70	0.64	0.64	0.02	0.02	0.43	0.76
71	0.31	0.44	0.09	0.09	0.49	0.56
72	0.30	0.35	0.19	0.18	0.46	0.54
73	0.57	0.36	0.08	0.20	0.60	0.72
74	0.40	0.39	0.19	0.07	0.16	0.53
75	0.68	0.34	0.07	0.07	0.86	0.86
76	0.43	0.26	0.09	0.09	0.30	0.63
77	0.32	0.11	0.17	0.17	0.19	0.94
78	0.39	0.22	0.08	0.08	0.19	0.32
79	0.84	0.47	0.16	0.16	0.45	0.33
80	0.54	0.15	0.10	0.10	0.63	0.44
81	0.39	0.19	0.06	0.06	0.40	0.51
82	0.41	0.30	0.08	0.08	0.17	0.36
83	0.41	0.22	0.15	0.15	0.57	0.52
84	0.58	0.62	0.10	0.10	0.39	0.70
85	0.42	0.55	0.11	0.11	0.34	0.76
86	0.35	0.26	0.17	0.17	0.57	0.56
87	0.29	0.48	0.29	0.29	0.41	0.45
88	0.14	0.14	0.29	0.29	0.40	0.35

TABLE AII.524

PHOSPHORUS BALANCE (WINTER 1954): FLIGHT 1
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
1	-0.35	-0.04	-----	-----	-----	+1.30
2	+0.07	-0.05	-0.99	-0.89	+0.82	+0.21
3	+0.03	+0.14	-1.16	-0.64	+0.24	+1.83
4	-0.29	+0.03	-0.99	-----	-----	+1.76
5	-0.15	-0.02	-0.82	-0.84	+0.95	+1.34
6	0.00	-0.70	-0.68	-0.97	+0.71	+1.49
7	-0.38	+0.09	-0.76	-0.62	+1.02	+1.42
8	-0.27	-----	-----	-0.69	+0.49	+1.33
9	-0.36	+0.05	-0.51	-0.37	+0.79	+1.07
10	-0.15	+0.11	-0.46	-0.36	+1.08	+1.17
11	-0.05	-0.14	-0.44	-0.16	+0.76	+1.29
12	-0.09	-0.04	-0.54	-0.25	+0.52	+1.08
13	+0.21	+0.11	-0.88	-0.61	+0.72	+1.35
14	+0.51	+0.23	-0.82	-0.90	+0.97	+2.12
15	+0.11	-0.15	-0.70	-0.45	+0.72	+0.69
16	+0.13	-----	-----	-0.34	+0.49	+1.14
17	-0.04	+0.06	-0.61	-0.60	+0.88	+1.44
18	-0.30	-0.15	-0.57	-0.63	+0.52	+0.72
19	-0.12	+0.10	-0.36	-0.35	+0.23	+0.84
20	-0.26	+0.08	-0.38	-0.29	+0.50	+1.03
21	+0.11	+0.02	-0.21	+0.06	+0.25	+1.11
22	-0.02	-0.17	-0.25	-0.27	+0.05	+0.54

TABLE AII.525

PHOSPHORUS BALANCE (WINTER 1954): FLIGHT 2
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
23	+0.51	+0.28	-1.33	-1.04	+0.95	+1.54
24	+0.10	+0.13	-0.99	-0.86	+1.00	+1.67
25	-0.15	-0.13	-0.88	-0.92	+0.09	+1.66
26	+0.07	+0.65	-1.14	-0.96	+1.09	+1.85
27	-0.03	+0.39	-0.72	-0.74	+0.84	+1.20
28	+0.09	-0.02	-0.78	-0.54	+1.03	+1.03
29	+0.32	+0.17	-0.61	-0.62	+0.34	+0.48
30	+0.23	+0.02	-0.65	-0.65	+0.74	+1.01
31	+0.24	-0.23	-0.88	-0.78	+1.04	+1.04
32	+0.05	+0.42	-0.79	-0.65	+0.43	+2.29
33	-0.06	+0.07	-0.76	-0.79	+0.31	+1.41

TABLE AII.525 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
34	-0.23	+0.02	-0.46	-0.61	+1.61	+1.60
35	-0.01	+0.12	-0.79	-0.75	+0.05	+1.95
36	-0.41	-0.09	-0.97	-0.85	+0.42	+1.78
37	+0.13	-0.10	-0.40	-0.30	+0.57	+1.47
38	-0.06	-0.09	-0.38	-0.36	+0.22	+1.59
39	-0.29	+0.09	-0.27	-0.45	+1.34	+2.18
40	+0.10	+0.01	-0.54	-0.60	+1.23	+1.11
41	-0.38	+0.09	-0.51	-0.28	+0.82	+1.77
42	-----	-----	-0.28	-0.35	+0.46	+1.68
43	+0.32	+0.31	-0.30	-0.47	+0.55	+1.13
44	-0.17	-0.03	-0.44	-0.76	+0.56	+0.59

TABLE AII.526

PHOSPHORUS BALANCE (WINTER 1954): FLIGHT 3
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
45	-0.10	-0.04	-1.47	-1.08	+0.61	+1.54
46	+0.15	+0.11	-1.07	-0.75	+0.46	+1.25
47	-0.08	+0.19	-0.49	-----	-----	+1.51
48	-0.06	-0.04	-0.80	-0.61	+0.85	+1.29
49	-0.07	-0.05	-0.65	-0.47	+0.90	+1.35
50	-0.07	+0.01	-0.66	-0.50	+1.03	+1.23
51	+0.08	-0.11	-0.56	-0.33	+0.88	+1.46
52	+0.21	+0.29	-0.80	-0.53	+0.64	+1.13
53	+0.19	+0.01	-0.81	-0.71	+1.17	+1.24
54	-0.31	+0.18	-0.77	-0.84	+1.43	+1.83
55	-0.27	+0.19	-0.09	-0.62	+0.41	+1.42
56	+0.03	-0.12	-0.70	-0.57	+0.86	+1.11
57	-0.60	-0.08	-1.03	-0.71	+1.25	+1.72
58	-0.42	+0.17	-0.48	-0.38	+0.92	+1.33
59	-0.58	+0.29	-0.75	-0.27	+1.14	+1.79
60	+0.04	+0.01	-0.60	-----	-----	+1.96
61	-----	-----	-0.40	-0.42	+0.66	+1.53
62	+0.14	+0.38	-0.29	-0.29	+0.59	+1.43
63	-0.32	+0.04	-0.14	-0.11	+0.21	+0.59
64	-0.38	+0.04	-0.56	-0.42	+1.16	+1.43
65	-0.05	-0.03	-0.49	-0.18	+0.49	+1.34
66	-0.23	-0.23	-0.32	-0.28	+0.19	+2.61

TABLE AII.527

PHOSPHORUS BALANCE (WINTER 1954): FLIGHT 4
(gm/day)

Subject Code No.	P I	P II	EXP I	EXP II	REC I	REC II
68	+0.17	-0.04	-1.01	-----	-----	+1.00
69	-0.01	-0.12	-1.26	-0.93	+0.42	+1.23
70	-0.11	-0.39	-0.95	-0.69	+0.99	+1.17
71	+0.47	-0.21	-0.70	-0.58	+0.65	+1.40
72	+0.02	-0.04	-0.84	-0.79	+0.72	+1.58
73	+0.03	+0.21	-0.69	-0.55	+0.91	+1.09
74	+0.01	0.00	-0.72	-0.44	+0.95	+1.58
75	-0.38	+0.06	-0.56	-0.71	+0.40	+1.47
76	-0.02	-0.04	-0.64	-0.73	+0.90	+1.35
77	-0.06	+0.18	-0.36	-0.47	+1.19	+1.20
78	+0.41	+0.31	-0.53	-0.42	+0.90	+1.29
79	-0.08	+0.20	-0.73	-0.65	+1.14	+1.94
80	-0.25	+0.15	-0.77	-0.55	+0.59	+1.49
81	+0.03	+0.30	-0.36	-0.26	+0.77	+1.68
82	+0.03	+0.08	-0.40	-0.46	+1.10	+1.75
83	-0.12	+0.14	-0.45	-0.35	+0.57	+1.16
84	-0.14	-0.15	-0.42	-0.38	+1.33	+1.07
85	+0.05	-0.24	-0.35	-0.52	+0.37	+1.37
86	-0.14	+0.09	-0.39	-0.39	+0.52	+1.23
87	+0.14	-0.26	-0.34	-0.11	+0.66	+1.40
88	+0.43	+0.32	-0.36	+0.12	+0.84	+1.50

C. STUDIES ON THE MEAT FOOD PRODUCT BAR
(Mary Huntwork)

In the four years of experience which we have had with the meat bar, we have been more and more impressed that this ration component has a deleterious effect on the nitrogen metabolism of the subject. We have given considerable thought to the possible mechanisms responsible for the consistent deterioration which we have observed. One of the methods of analyzing the nutrient value of a protein-containing food is to calculate its biological value. Although the various metabolic experiments which we have undertaken have not been conducted in such a fashion as that demanded for a rigorous measurement of biological value, nevertheless, we are of the opinion that we can make an estimate of that value from the many observations which we have accumulated in an experience involving some 8700 subject days.

In making calculations of biological values from our data, we have used the formulas of Mitchell (Hawk et al., 1951) and Allison (1955). Mitchell's formula is:

$$B.V. = 100 \times \frac{I - (F-F_m) - (U-U_e)}{I - (F-F_m)}$$

where I = intake of nitrogen, F = fecal output of nitrogen, and U = urinary output of nitrogen. F_m and U_e are metabolic fecal nitrogen and endogenous urinary nitrogen obtained from a subject subsisting on an isocaloric nitrogen-free diet. Allison's formula is:

$$B.V. = 100 \times \frac{B + F_m + U_e}{I - (F-F_m)}$$

where B represents the nitrogen balance. The other symbols have the same meaning as in Mitchell's formula. It will be noted that these formulae have identical denominators. They differ in the numerator. Mitchell's formula utilizes nitrogen intake whereas Allison's formula utilizes nitrogen balance.

In order to provide data on metabolic fecal and urinary nitrogen in those cases where the subjects had not subsisted on isocaloric nitrogen-free diets, we made the assumption that the metabolic values could be calculated from average data for men who had subsisted on the pure carbohydrate regimens. It is quite probable that the mean metabolic nitrogen lost by these men was not significantly different from that which would have been lost by the subjects who subsisted on diets containing the meat bar.

In Table AII.528, we summarize the mean biological value for the meat bar as calculated according to the formula of Mitchell. Data there are presented for the subjects studies in 1953, 1954, and 1955. We have not taken into account whether or not the subjects were on restricted water because our analysis revealed that water intake did not significantly

alter the result. Several points are of noteworthy significance. First, the biological values are very low, and in one case, even negative. Second, there is no constant difference between the meat bar fed at 1000 Cal/man/day and at 2000 Cal/man/day. Third, when we compare 30/0/70 1000 and 15/52/33 2000, we observe that a nutrient mixture containing isocaloric amounts of protein and fat but increased amounts of carbohydrate causes the biological value to increase in every comparison. This suggests that addition of carbohydrate to the meat bar improves the ability of the human body to utilize the protein. Even when the total caloric intake is kept constant and the nitrogen and fat are replaced with carbohydrate so that their values are reduced by approximately 50%, we see evidence of the same phenomenon. Compare, for example, 30/0/70 2000 with 15/52/33 2000. In all cases, even though the total intake of protein is reduced, the biological value is increased.

TABLE AII.528

CALCULATION OF "BIOLOGICAL VALUE"
OF MEAT FOOD PRODUCT BAR: FORMULA OF MITCHELL

Year	Work Load	30/0/70 1000	15/52/33 1000	30/0/70 2000	15/52/33 2000
1953	Moderate	10.3	14.4	33.9	39.3
1954	Hard	22.9	0.7	18.7	29.5
	Light	-15.0	30.0	2.1	18.2
1955	Hard	11.0	16.7	12.6	42.1
	Light	8.5	21.5	14.0	27.0

Similar conclusions are evident in Table AII.529 where we have calculated the biological value by the formula of Allison. The values are much more variable and quite a number are negative. It is probable that the large negative values of the 1955 period can be attributed to loss of nitrogen in sweat. It will be recalled that Allison's formula uses nitrogen balance in the calculation of biological value. Except for this variable, the 1953 and the 1954 periods tend to support the conclusions of Table AII.528.

TABLE AII.529

CALCULATION OF "BIOLOGICAL VALUE"
OF MEAT FOOD PRODUCT BAR: FORMULA OF ALLISON

Year	Work Load	30/0/70 1000	15/52/33 1000	30/0/70 2000	15/52/33 2000
1953	Moderate	11.5	15.2	30.8	42.4
1954	Hard	17.7	- 9.7	16.8	24.1
	Light	-32.8	18.8	- 0.7	9.0
1955	Hard	-26.8	-67.2	- 5.3	5.7
	Light	- 1.6	-47.6	- 1.9	- 4.3

One criticism which may be leveled at these calculations is that the basic assumption we made invalidates these data. Fortunately, we can examine evidence supporting the validity of this assumption in the data collected in 1953. In that year a number of the subjects who subsisted on meat bar had subsisted on an isocaloric intake of pure carbohydrate. Therefore, we could use the individual as his own control and calculate the biological value accordingly. The results summarized in Table AII.530 indicate that the biological values are of the same order of magnitude as those presented in the preceding tables, and that there is striking agreement between the values from Mitchell's formula and Allison's formula in all cases except the data for Subject 6. We, thus, feel that our assumption is sustained.

TABLE AII.530

CALCULATION OF "BIOLOGICAL VALUE" OF MEAT FOOD PRODUCT BAR: THE EFFECT OF THE INDIVIDUAL

Subject Code No.	Nutrient Regimen	Caloric Intake	Mitchell	Allison
1	30/0/70	2000	44.6	42.2
2	30/0/70	2000	31.8	28.0
3	15/52/33	2000	23.8	21.2
5	15/52/33	1000	10.0	16.6
6	15/52/33	1000	-17.5	27.7
7	30/0/70	1000	27.7	35.9
8	30/0/70	1000	0.0	- 8.1

Because of the large negative nitrogen balances among men subsisting on meat bar and because our calculations of nitrogen required to maintain balance were almost twice as high as those based on calculations from the study performed by Doctor R. E. Johnson at Camp Shilo, Canada (Sargent et al., 1955), it was logical to hypothesize that the meat bar might be deficient in essential amino acid. Doctor Harry Spector, Chief of Nutrition Branch, Food Laboratories, Quartermaster Food and Container Institute, kindly agreed to perform amino acid analyses of the meat food product bar used in the 1953 temperate study and the 1954 winter study. His analyses are summarized in Table AII.531.

TABLE AII.531

CHEMICAL ANALYSIS OF MEAT FOOD PRODUCT BAR

A. Proximate Analysis

	Moisture %	Ash %	Fat %	Protein %
1953 Meat Bar	6.31	3.26	46.02	42.62
1954 Meat Bar	5.89	3.48	44.57	44.06

TABLE AII.531 (Contd)

B. Total Amino Acid Content (mg/gm)

Amino Acid	1953 Bar	1954 Bar
Histidine	49.74	43.90
Lysine	95.12	95.32
Methionine	26.25	24.85
Cystine	11.13	11.76
Phenylalanine	45.12	45.56
Tyrosine	30.76	30.72
Leucine	81.03	86.50
Isoleucine	54.18	50.19
Valine	64.33	65.52
Threonine	49.84	50.19
Tryptophan	12.64	12.48
Arginine	79.00	84.75

It is evident from inspection of this table that there are no deficiencies of essential amino acids in the meat bar. On the basis of these data, Doctor Spector calculated that the Pepsin Digest Residue Amino Acid Index was 84.0 for the 1953 meat bar and 84.6 for the 1954 meat bar. This index is equivalent to the biological value x digestibility. Men subsisting on meat bar in our experience do not pass unusual amounts of fecal nitrogen and so the digestibility of the protein is certainly of the order of 95%.

It should be evident at once that there is striking difference between the biological value of the meat bar calculated from enzymatic studies in the test tube and the biological value of the meat bar tested in a healthy young man. These discrepencies at first gave us considerable concern. Recent studies by Dr. Doris Calloway and her colleagues (1955 a and b) indicate that when good quality protein is fed in large amounts to a calorie-deficient animal, the biological value is low. Under the conditions of our study, the men were in negative caloric balance and at the time were given rather large amounts of nitrogen. It is probable that the observations of Calloway on rats provide a partial explanation for our findings. We, therefore, more properly should label our calculations as "indices of protein utilization".

Our feeling is strong, however, that the entire question is not so simply resolved. Meat bar, in our hands, is definitely deleterious. It greatly augments the minimal nitrogen requirement. It is associated with large negative nitrogen balance. Subjects eating meat bar pass large numbers of undigested muscle fibers in their feces. It ranks close to starvation when judged on the basis of numerous function tests of organs and systems. These findings indicate that there is considerable justification in abandoning pemmican as a ration component.

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APPENDIX III

DIETARY DATA

In this appendix the mean daily intakes of the several nutrients studied for each of the seven periods of the investigation have been tabulated for each of the 88 volunteer subjects who were not FRA controls. Dashes have the same meaning as in Appendix II. Water intakes were the only items of diet recorded in REC III.

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
1	P I	1750	547	384	2840	387	54	102	32	103	14	16.5	0.8	2.2	6.4	4.4	9.1
	P II	2367	516	352	2636	367	56	88	30	91	14	14.6	0.6	1.7	5.1	3.2	7.7
	EXP I	2096	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
	REC I	1312	796	353	2598	354	54	87	30	115	18	18.4	0.8	2.3	6.6	4.4	9.9
	REC II	2061	873	550	4208	590	56	126	27	150	14	24.0	0.1	2.8	8.2	5.3	11.2
	REC III	2375	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
2	P I	1896	504	395	2954	407	55	101	31	104	14	16.6	1.1	2.5	6.4	4.9	9.7
	P II	2662	516	409	3006	422	56	108	32	97	13	15.5	0.6	1.7	6.1	3.1	9.4
	EXP I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
3	P I	2325	653	499	3748	493	53	137	33	138	15	22.1	1.1	3.0	8.4	5.8	10.1
	P II	2721	510	493	3689	536	58	122	30	99	11	15.8	0.6	1.8	7.3	3.3	10.9
	EXP I	2892	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
	REC I	1950	852	434	3212	426	53	116	32	132	16	21.1	0.9	2.5	7.6	4.6	11.3
	REC II	2409	797	579	4980	678	54	156	28	159	13	25.4	1.3	3.2	8.7	6.1	11.9
	REC III	2975	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
4	P I	2217	663	496	3688	489	53	137	33	137	15	21.9	0.9	2.8	8.6	5.4	12.6
	P II	2775	678	471	3555	458	52	134	34	129	14	20.6	0.6	2.1	7.8	3.9	11.9
	EXP I	2550	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---
	REC I	1412	852	436	3224	430	53	116	32	132	16	21.1	0.9	2.5	7.7	4.6	11.3
	REC II	2614	1074	710	5166	775	60	162	28	174	13	27.8	1.0	2.9	9.6	5.2	12.7
	REC III	3300	---	---	----	---	--	---	--	---	--	----	---	---	---	---	---

*(1) = Liquid intake (2) = Metabolic water (3) = Preformed water

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
5	P I	1933	623	382	2981	342	46	117	35	126	17	20.2	1.0	2.6	7.2	5.4	10.6
	P II	2250	649	316	2409	273	45	100	37	111	18	17.8	0.6	1.8	5.7	3.2	8.5
	EXP I	3350	22	150	998	250	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
6	P I	2550	747	524	4070	507	50	145	32	158	16	25.3	1.4	3.6	9.3	7.2	13.8
	P II	3479	732	480	3725	456	49	140	34	138	15	22.1	0.7	2.2	8.3	4.2	12.5
	EXP I	3200	0	150	0	0	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2750	28	149	1000	249	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	1950	827	378	2772	389	56	90	29	118	17	18.9	0.9	2.3	6.7	4.4	10.1
	REC II	3023	1026	658	5137	688	54	157	28	189	15	30.2	1.3	3.1	10.1	6.4	14.7
	REC III	2812	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
7	P I	3700	769	526	3972	507	51	149	34	152	15	24.3	1.2	3.0	7.4	5.8	13.3
	P II	4012	759	532	4147	528	51	144	31	150	15	24.0	0.8	2.3	8.8	4.2	13.1
	EXP I	3900	39	302	2004	504	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2700	42	302	2000	503	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	3150	868	439	3249	430	53	148	33	134	16	21.4	1.0	2.6	7.7	4.6	11.3
	REC II	3686	1080	658	5101	686	54	161	28	182	14	29.1	1.4	3.3	10.1	6.1	14.0
	REC III	3300	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
8	P I	2779	529	465	3469	491	57	114	30	118	14	18.9	1.0	2.7	7.7	5.3	11.4
	P II	3896	570	470	3557	482	54	123	31	119	13	19.0	0.7	2.0	7.6	4.0	11.2
	EXP I	3900	5	260	1690	434	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2638	56	299	2003	499	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2412	724	407	3030	390	51	112	33	129	17	20.6	0.9	2.5	7.5	4.5	11.1
	REC II	3352	846	563	4598	552	48	149	29	176	15	28.2	1.2	3.1	9.9	5.9	13.5
	REC III	3700	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
9	P I	2733	738	609	4487	638	57	152	30	155	14	24.8	1.5	3.7	9.6	7.0	14.5
	P II	3438	705	552	4160	573	55	145	31	130	12	20.8	0.8	2.2	8.4	4.1	12.4
	EXP I	3900	70	111	997	0	0	75	70	75	30	12.0	0.0	0.1	1.2	1.1	0.0
	EXP II	3212	70	111	997	0	0	75	70	75	30	12.0	0.0	0.1	1.2	1.1	0.0
	REC I	2275	830	380	2784	392	56	90	29	118	17	18.9	0.9	2.3	6.7	4.4	10.1
	REC II	3067	1269	706	5485	760	55	164	27	181	13	29.0	1.3	3.3	10.2	6.3	14.0
	REC III	4012	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
10	P I	1846	637	383	2844	362	51	116	37	101	14	16.5	0.3	1.2	6.8	2.1	10.1
	P II	2588	632	438	3249	448	55	119	33	103	13	16.5	0.3	1.2	6.8	1.9	10.7
	EXP I	2950	40	111	997	0	0	75	70	75	30	12.0	0.0	0.6	1.2	1.1	0.0
	EXP II	2750	10	111	997	0	0	75	70	75	30	12.0	0.0	0.6	1.2	1.1	0.0
	REC I	2062	824	369	2706	383	57	86	29	116	17	18.6	0.9	2.3	6.6	4.4	10.0
	REC II	2907	980	652	5056	662	52	168	30	184	15	29.4	1.2	3.2	9.8	5.7	13.2
	REC III	3050	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
11	P I	3238	741	556	4126	551	53	150	33	159	15	25.4	1.4	3.6	9.4	7.0	14.1
	P II	4038	761	531	3981	520	52	150	34	142	14	22.7	0.8	2.3	8.6	4.3	13.1
	EXP I	4750	80	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.5	2.1	0.0
	EXP II	4138	20	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.5	2.1	0.0
	REC I	2925	864	420	3110	414	53	110	32	132	17	21.1	1.0	2.5	7.6	4.6	11.3
	REC II	4107	1002	659	5056	650	51	180	32	186	15	29.8	1.3	3.6	10.2	6.2	14.0
	REC III	3100	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
12	P I	2804	710	477	3575	445	50	141	35	145	16	23.2	1.1	3.0	8.4	5.9	12.4
	P II	3167	710	414	3129	368	47	131	38	130	17	20.8	0.7	2.1	7.3	4.0	10.9
	EXP I	4200	27	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.5	2.1	0.0
	EXP II	5025	140	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.5	2.1	0.0
	REC I	3750	874	440	3253	431	53	118	33	134	16	21.4	1.0	2.6	7.7	4.7	11.4
	REC II	3410	1266	708	5490	680	50	201	33	206	15	33.0	1.3	3.6	11.2	6.6	15.4
	REC III	3350	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	(2)	(3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
13	P I	2400	703	475	3530	460	52	132	34	140	16	22.4	1.0	2.7	8.2	5.2	12.1
	P II	2675	718	469	3569	461	52	129	33	132	15	21.1	0.6	2.0	7.9	3.6	11.8
	EXP I	2600	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	EXP II	2700	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
14	P I	2783	721	488	3617	469	52	138	34	143	16	22.9	1.0	2.8	9.0	5.3	12.5
	P II	3200	723	502	3743	486	51	143	34	141	15	22.6	0.7	2.2	8.6	4.0	13.0
	EXP I	3600	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	EXP II	4912	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	REC I	3300	392	367	2686	389	58	82	27	112	17	17.9	0.9	2.3	6.4	4.3	9.6
	REC II	3706	1310	752	6007	707	47	214	32	241	16	38.6	1.4	4.1	13.3	6.8	17.8
	REC III	4100	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
15	P I	3125	708	564	4174	575	55	145	31	158	15	25.0	1.4	3.5	9.4	6.8	13.9
	P II	3375	602	464	3478	479	55	124	32	106	12	17.0	0.7	2.0	7.2	3.8	10.4
	EXP I	2100	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	EXP II	3950	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.6	0.2	5.5
	REC I	3638	435	864	3237	428	53	116	32	133	16	21.3	1.0	2.6	7.7	4.6	11.3
	REC II	1800	882	664	4841	667	55	184	34	162	13	25.9	0.1	3.2	7.4	5.7	9.7
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
16	P I	2492	672	512	3823	520	54	131	31	145	15	23.2	1.3	3.2	8.6	6.2	13.0
	P II	2650	660	463	3483	489	56	115	30	111	13	17.8	0.7	2.0	7.5	3.7	11.6
	EXP I	3500	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.6	0.2	5.5
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	(2)	(3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm.
17	P I	2558	723	503	3732	488	52	139	34	150	16	24.0	1.2	3.0	7.1	6.4	12.6
	P II	4087	433	195	1515	220	58	39	23	53	14	8.5	0.6	1.0	2.4	1.9	3.4
	EXP I	3267	126	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	EXP II	3525	126	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	REC I	2725	800	367	2675	386	58	84	28	112	17	17.9	0.9	2.3	6.4	4.3	9.7
	REC II	3108	1052	559	4286	550	51	148	31	172	16	27.5	1.2	3.1	8.4	5.6	11.5
	REC III	2950	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
18	P I	2525	451	421	3188	401	50	124	35	117	15	18.7	0.8	2.4	7.6	4.8	11.6
	P II	3362	462	405	3060	392	51	118	35	105	14	16.8	0.5	1.8	7.1	3.4	10.4
	EXP I	3000	55	136	1011	136	54	38	34	34	13	5.4	0.0	0.4	1.3	0.8	1.3
	EXP II	2762	40	136	1011	136	54	38	34	34	13	5.4	0.0	0.4	1.3	0.8	1.3
	REC I	2900	761	363	2664	377	57	86	29	110	16	17.6	0.9	2.2	6.2	4.2	9.4
	REC II	3411	912	694	5369	718	53	180	30	173	13	27.7	1.2	3.1	9.0	5.6	12.5
	REC III	3763	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
19	P I	2096	586	401	3052	369	48	119	35	128	17	20.5	1.0	2.6	6.8	4.9	10.2
	P II	2588	645	380	2953	344	47	117	36	119	16	19.0	0.8	2.0	6.4	3.6	9.9
	EXP I	2400	157	271	2015	268	53	76	34	71	14	11.4	0.2	0.7	3.4	1.9	3.2
	EXP II	2900	134	271	2015	268	53	76	34	71	14	11.4	0.2	0.7	3.4	1.9	3.2
	REC I	3525	839	416	3076	412	53	108	31	129	17	20.6	0.9	2.5	7.4	4.6	10.9
	REC II	2140	706	442	3547	438	49	118	30	128	14	20.5	1.1	2.8	6.9	4.8	9.1
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
20	P I	2521	643	403	3156	372	47	119	34	128	16	20.5	0.9	2.5	7.7	4.9	11.6
	P II	2525	678	412	3166	400	51	114	32	122	15	19.5	0.6	1.9	7.4	3.7	11.2
	EXP I	3000	179	271	2015	268	53	76	34	71	13	11.4	0.2	0.7	3.4	1.9	3.2
	EXP II	1500	107	271	1637	216	53	62	34	55	13	8.8	0.2	0.6	1.9	0.6	2.6
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
21	P I	2433	646	363	2731	328	48	107	35	125	18	20.0	1.1	2.8	6.7	5.3	9.9
	P II	3029	635	370	2825	338	48	112	36	116	16	18.6	0.7	2.0	6.4	3.5	9.6
	EXP I	3850	233	407	3016	401	53	115	34	105	14	16.8	0.3	1.1	4.1	2.4	4.4
	EXP II	4925	233	407	3016	401	53	115	34	105	14	16.8	0.3	1.1	4.1	2.4	4.4
	REC I	2988	790	408	3034	396	52	109	32	131	17	21.0	1.0	2.5	7.5	4.4	11.1
	REC II	3351	794	504	3954	480	49	143	33	154	16	24.6	1.2	3.1	9.2	5.2	11.9
	REC III	4100	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
22	P I	2617	704	473	3590	454	51	133	33	141	16	22.6	1.2	3.0	8.3	5.9	10.1
	P II	3108	713	416	3202	383	48	126	35	126	16	20.2	0.8	2.1	7.1	4.0	10.9
	EXP I	4050	203	407	3016	401	53	115	34	105	14	16.8	0.2	1.1	4.1	2.4	4.5
	EXP II	3700	176	407	3016	401	53	115	34	105	14	16.8	0.2	1.1	4.1	2.4	4.5
	REC I	3738	846	410	3026	412	54	103	31	128	17	20.5	1.0	2.5	7.5	3.3	11.0
	REC II	3773	879	557	4192	563	54	146	31	154	15	24.6	1.2	2.8	8.6	5.4	11.8
	REC III	3300	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
23	P I	2538	600	438	3206	465	58	108	30	105	13	16.8	0.9	2.2	6.7	4.5	9.9
	P II	2308	556	390	2856	417	58	97	30	88	12	14.1	0.7	1.7	5.4	3.5	7.9
	EXP I	1633	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1862	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2225	711	352	2578	373	58	78	27	108	17	17.3	0.9	2.2	6.1	4.2	9.2
	REC II	2620	1173	652	5017	716	57	148	27	155	12	24.8	1.4	3.0	7.8	5.9	11.8
	REC III	5613	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
24	P I	2158	521	416	3034	436	57	107	32	97	13	15.5	0.8	2.2	6.2	4.4	9.4
	P II	2792	577	396	2908	397	55	111	34	94	13	15.0	0.7	1.8	5.9	3.5	8.8
	EXP I	1558	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1950	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2612	738	361	2659	367	55	88	30	114	17	18.2	0.9	2.3	6.5	4.3	9.8
	REC II	1800	1108	732	5306	774	54	186	32	167	13	26.7	1.2	3.3	9.2	6.1	11.5
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
25	P I	2838	690	449	3342	453	54	117	32	126	15	20.2	1.0	2.7	7.6	5.4	11.3
	P II	2662	616	372	2829	365	52	104	33	101	14	16.2	0.6	1.8	6.2	3.6	9.3
	EXP I	1883	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1975	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2488	750	362	2682	367	55	88	29	116	17	18.6	0.9	2.3	6.6	4.3	9.9
	REC II	2946	1285	729	5618	788	56	168	27	186	13	29.8	1.4	3.4	11.6	6.8	15.0
	REC III	4638	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
26	P I	2458	754	496	3793	479	50	138	33	148	16	23.7	1.2	3.1	8.6	6.0	12.7
	P II	2621	678	412	3185	384	48	122	34	124	16	19.8	0.7	2.0	7.0	3.9	10.4
	EXP I	1850	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1350	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2215	746	363	2675	366	55	90	30	116	17	18.6	0.9	2.3	6.6	4.3	9.9
	REC II	2655	1344	670	5306	713	54	154	26	188	14	30.1	1.3	3.2	11.2	6.1	14.4
	REC III	3750	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
27	P I	3175	714	495	3729	491	53	130	31	150	16	24.0	1.1	3.2	9.0	6.8	13.2
	P II	2671	721	432	3397	410	48	124	34	130	15	20.8	0.7	2.1	7.8	4.1	11.4
	EXP I	1888	26	150	998	250	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1962	26	136	907	226	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2088	816	370	2711	382	56	87	29	116	17	18.6	0.9	2.3	6.6	4.4	10.0
	REC II	3211	1383	597	4826	608	50	140	26	203	17	32.5	1.3	3.4	11.3	6.5	15.6
	REC III	3263	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
28	P I	2554	668	515	3858	492	51	149	35	147	15	23.5	1.1	2.8	8.7	5.7	12.7
	P II	2850	672	454	3513	421	48	137	35	133	15	21.3	0.8	2.2	7.6	4.1	11.5
	EXP I	1867	19	151	999	252	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2325	21	151	1001	252	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2250	734	360	2656	361	54	90	30	116	17	18.6	0.9	2.3	6.5	4.3	9.8
	REC II	3379	1112	701	5366	700	52	186	31	200	15	32.0	1.4	3.6	10.8	6.4	14.8
	REC III	3725	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
29	P I	2671	742	525	3995	518	52	142	32	152	15	24.3	1.2	3.2	9.2	6.1	13.6
	P II	2733	706	465	3576	452	51	132	33	129	14	20.6	0.7	2.1	7.8	4.1	11.6
	EXP I	1796	39	302	2004	504	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2475	39	302	2004	504	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2650	859	438	3228	428	53	118	33	133	16	21.3	0.9	2.6	7.6	4.6	11.2
	REC II	2755	1297	677	5410	672	50	182	30	193	14	30.9	1.3	3.5	10.7	6.8	14.9
	REC III	4888	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
30	P I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	P II	2342	656	388	2937	370	50	111	34	114	16	18.2	0.7	2.0	6.2	3.6	9.3
	EXP I	1792	47	301	2003	501	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1988	56	299	2003	499	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2675	818	422	3121	412	53	114	33	128	16	20.5	1.0	2.5	7.4	4.5	10.9
	REC II	2344	865	528	4012	546	54	130	29	149	15	23.8	1.2	3.0	7.5	5.4	10.4
	REC III	3100	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
31	P I	2617	786	447	3417	403	47	144	38	125	15	20.0	0.6	1.7	7.9	3.3	11.6
	P II	3058	718	424	3264	378	46	137	38	124	15	19.8	0.6	1.8	7.3	3.4	11.1
	EXP I	1800	22	111	997	0	0	75	70	75	30	12.0	0.0	0.6	1.2	1.1	0.0
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
32	P I	1758	635	462	3487	475	54	119	31	121	14	19.4	1.1	2.6	7.4	5.1	10.8
	P II	2342	633	442	3341	444	53	120	32	115	14	18.4	0.7	2.0	7.0	3.7	10.4
	EXP I	1879	20	111	997	0	0	75	70	75	30	12.0	0.0	0.6	1.2	1.1	0.0
	EXP II	2262	10	111	997	0	0	75	70	75	30	12.0	0.0	0.6	1.2	1.1	0.0
	REC I	2000	736	364	2656	381	57	86	29	105	16	16.8	0.9	2.2	6.1	4.2	8.7
	REC II	2338	965	546	4247	613	58	116	25	131	12	21.0	1.3	2.9	6.7	5.5	9.3
	REC III	3325	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
33	P I	2521	703	477	3595	456	51	136	34	141	16	22.6	0.9	2.8	8.3	5.4	12.2
	P II	2746	642	404	3041	375	49	122	36	119	16	19.0	0.5	1.8	6.7	3.4	10.1
	EXP I	1950	32	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.4	2.1	0.1
	EXP II	2700	20	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.4	2.1	0.1
	REC I	3625	853	426	3164	414	52	116	33	131	16	21.0	1.0	2.5	7.5	4.6	11.1
	REC II	4388	1177	615	4876	594	49	172	32	182	15	29.1	0.8	2.5	10.0	4.6	13.3
	REC III	5725	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
34	P I	2054	617	409	3125	377	48	125	36	119	15	19.0	0.6	2.1	7.4	3.8	11.0
	P II	2317	624	353	2662	340	51	103	35	95	14	15.2	0.4	1.4	5.7	2.7	8.7
	EXP I	1950	32	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.4	2.1	0.1
	EXP II	2562	20	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.4	2.1	0.1
	REC I	2762	827	413	3069	403	52	112	33	126	16	20.2	0.8	2.3	7.4	4.1	10.9
	REC II	2129	952	452	3478	467	54	118	31	110	13	17.6	0.9	2.2	6.2	4.4	8.4
	REC III	2700	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
35	P I	1704	643	435	3284	420	51	123	34	126	15	20.2	0.9	2.5	7.6	4.9	11.2
	P II	2154	642	386	2916	370	51	110	34	142	15	17.9	0.7	1.9	6.1	3.6	9.2
	EXP I	1896	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	EXP II	2212	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	REC I	1775	816	375	2746	386	56	89	29	117	17	18.7	0.9	2.3	6.6	4.4	10.0
	REC II	2053	1159	603	4479	641	57	145	29	154	14	24.6	1.2	2.9	7.8	5.6	10.9
	REC III	3113	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
36	P I	2438	707	446	3386	415	49	134	36	130	15	20.8	0.7	2.2	8.0	4.6	11.7
	P II	2950	720	412	3160	360	46	135	38	126	16	20.2	0.6	1.7	7.0	3.2	10.7
	EXP I	1917	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	EXP II	2700	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	REC I	2700	741	359	2650	364	55	87	29	116	17	18.6	0.9	2.3	6.6	4.2	10.0
	REC II	2743	1167	630	5009	626	50	158	28	208	17	33.3	1.2	3.1	10.7	6.1	14.9
	REC III	3750	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
37	P I	1996	595	441	3383	425	50	124	33	131	16	21.0	1.0	2.6	8.0	4.9	11.7
	P II	2258	593	417	3280	408	50	114	31	122	15	19.5	0.7	1.9	7.1	3.5	10.8
	EXP I	1950	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	EXP II	2625	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	REC I	1862	836	427	3168	414	52	116	33	132	17	21.1	1.0	2.6	7.6	4.6	11.2
	REC II	2867	891	515	4225	483	46	142	30	178	17	28.5	1.2	3.0	9.0	5.4	13.1
	REC III	3625	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
38	P I	2396	658	421	3260	379	47	136	38	118	14	18.9	0.5	1.6	7.6	2.8	10.8
	P II	2517	674	429	3244	391	48	135	37	121	15	19.4	0.4	1.6	7.5	2.9	11.0
	EXP I	1950	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	EXP II	2550	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	REC I	2338	832	372	2802	340	48	113	36	114	16	18.2	0.6	1.6	6.8	2.6	9.8
	REC II	2984	1004	656	5110	578	45	212	37	201	16	32.2	0.9	2.9	11.6	4.8	16.2
	REC III	3535	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
39	P I	2762	691	342	2563	294	46	116	41	101	16	16.2	0.5	1.4	6.0	2.8	9.1
	P II	2908	717	400	3049	363	48	127	38	113	15	18.1	0.5	1.5	6.7	2.8	9.9
	EXP I	1950	1093	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	EXP II	2400	96	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	REC I	3000	498	154	1128	164	58	34	27	46	14	7.4	0.2	0.6	2.9	1.1	3.9
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
40	P I	3658	691	493	3715	476	51	139	34	142	15	22.7	1.3	3.2	8.3	6.2	12.6
	P II	3471	622	363	2893	353	49	103	32	101	14	16.2	0.7	1.7	5.8	3.3	8.1
	EXP I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
41	P I	2471	662	473	3548	468	53	130	33	129	14	20.6	1.1	2.8	7.6	5.3	11.3
	P II	2208	600	419	3138	412	52	119	34	108	14	17.3	0.6	1.9	6.4	3.7	9.4
	EXP I	1200	164	271	2015	268	53	76	34	71	14	11.4	0.2	0.7	3.4	1.9	3.2
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
42	P I	2535	728	481	3753	458	49	136	33	148	16	23.7	1.1	2.8	8.2	5.4	12.0
	P II	2929	717	484	3681	469	50	142	35	138	15	22.1	0.8	2.3	8.0	4.2	12.1
	EXP I	1950	141	271	2015	268	53	76	34	71	14	11.5	0.2	0.7	3.4	1.9	3.2
	EXP II	2700	134	271	2015	268	53	76	34	71	14	11.5	0.2	0.7	3.4	1.9	3.2
	REC I	2912	867	439	3245	432	53	117	32	133	16	21.3	1.0	2.6	7.6	4.6	11.3
	REC II	3020	1143	650	5369	600	45	194	33	201	15	32.2	1.3	3.7	11.6	6.2	15.7
	REC III	2900	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
43	P I	2308	596	387	2878	384	53	105	33	108	15	17.3	1.0	2.5	6.4	4.8	9.4
	P II	2233	702	436	3284	424	52	124	34	119	14	19.0	0.6	1.7	7.0	3.2	10.5
	EXP I	1950	200	407	3016	401	53	115	34	105	14	16.8	0.2	1.1	4.1	2.4	4.5
	EXP II	2700	173	407	3016	401	53	115	34	105	14	16.8	0.2	1.1	4.1	2.4	4.5
	REC I	2650	867	440	3250	432	53	118	33	134	16	21.4	1.0	2.6	7.7	4.6	11.3
	REC II	2887	1020	542	4380	558	51	133	27	158	14	25.3	1.2	3.0	8.8	5.3	11.7
	REC III	2813	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
44	P I	3267	815	602	4472	609	54	159	32	163	15	26.1	1.4	3.4	9.7	6.6	14.4
	P II	3758	771	546	4212	537	51	153	33	147	14	23.5	0.8	2.4	8.3	4.4	13.5
	EXP I	1950	233	407	3016	401	53	115	34	105	14	16.8	0.2	1.1	4.1	2.4	4.5
	EXP II	2700	173	407	3016	401	53	115	34	105	14	16.8	0.2	1.1	4.1	2.4	4.5
	REC I	3750	854	400	2989	382	51	113	34	122	16	19.5	0.7	2.0	7.1	3.4	10.5
	REC II	4491	1107	612	4868	613	50	160	30	177	15	28.3	1.4	3.4	9.4	6.1	13.0
	REC III	4888	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
45	P I	3017	745	499	3824	475	50	142	33	152	16	24.3	1.1	3.1	8.7	5.8	13.5
	P II	4646	740	502	3844	486	51	146	34	133	14	21.3	0.6	2.0	8.5	3.7	13.0
	EXP I	2883	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1800	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2625	752	364	2688	369	55	88	29	117	17	18.7	0.9	2.3	6.6	4.4	9.9
	REC II	2951	1038	725	5196	752	58	187	32	180	14	28.8	1.3	3.4	9.1	5.9	13.3
	REC III	5773	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
46	P I	2808	688	511	4119	512	50	134	29	(148)	18	23.7	1.2	3.2	8.9	6.1	13.3
	P II	3546	535	267	2035	250	49	80	35	76	15	12.2	0.4	1.2	4.5	2.4	6.7
	EXP I	2750	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2550	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2475	756	367	2700	370	55	90	30	118	17	18.9	0.9	2.3	6.6	4.3	10.0
	REC II	2568	1282	766	5997	794	53	190	29	210	14	33.6	1.4	3.6	12.4	6.4	17.4
	REC III	4875	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
47	P I	2325	662	438	3381	410	48	130	35	130	15	20.8	0.9	2.4	7.7	4.5	12.1
	P II	3908	623	420	3173	397	50	126	36	114	14	18.2	0.7	2.0	7.0	3.9	10.5
	EXP I	1992	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1800	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	4050	734	361	2656	366	55	88	30	116	17	18.6	0.9	2.3	6.5	4.3	9.8
	REC II	2899	686	512	3903	524	54	133	31	136	14	21.8	0.9	2.7	7.7	5.2	10.8
	REC III	3900	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
48	P I	2350	762	531	4012	514	51	148	33	157	16	25.1	1.2	3.3	9.0	6.3	13.9
	P II	3933	733	572	4365	569	52	158	33	149	14	23.8	0.9	2.5	9.4	4.7	14.3
	EXP I	3050	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	3150	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2725	756	367	2700	370	55	90	30	118	17	18.9	0.9	2.3	6.6	4.4	10.0
	REC II	2873	1170	751	5822	741	51	202	31	220	15	35.2	1.4	3.9	11.5	6.7	16.4
	REC III	4650	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
49	P I	3179	762	553	4211	542	52	160	32	163	16	26.1	1.4	3.6	9.9	6.8	15.6
	P II	4800	730	528	3949	523	53	148	34	137	14	21.9	0.8	2.2	8.8	4.3	13.3
	EXP I	3550	22	150	998	250	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	3300	18	94	666	156	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	4300	830	379	2780	390	56	90	29	118	17	18.9	0.9	2.3	6.7	4.4	10.1
	REC II	3884	1100	660	5237	641	49	184	32	192	15	30.7	1.3	3.7	11.1	6.4	15.4
	REC III	5000	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
50	P I	2742	708	490	3685	457	50	142	35	156	17	25.0	1.3	3.4	9.2	6.3	13.2
	P II	3396	680	426	3204	406	51	122	34	126	16	20.2	0.7	2.0	7.4	3.6	11.1
	EXP I	2321	17	151	996	252	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1050	17	151	996	252	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2525	821	376	2756	386	56	90	29	117	17	18.7	0.9	2.3	6.6	4.4	10.1
	REC II	2792	858	582	4569	550	48	166	33	182	16	29.1	1.3	3.3	9.5	6.0	13.3
	REC III	3663	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
51	P I	3104	686	488	3766	483	51	128	31	149	16	23.8	1.7	3.4	8.3	6.6	12.6
	P II	3412	494	377	2645	428	65	84	28	73	11	11.7	0.7	1.6	4.8	3.2	7.6
	EXP I	2950	48	301	2004	502	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2700	56	299	2003	499	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	3250	832	418	3076	426	55	104	30	124	16	19.8	0.9	2.4	7.2	4.5	10.7
	REC II	3297	1037	595	4572	640	56	136	27	160	14	25.6	1.3	3.0	8.9	5.8	16.2
	REC III	4875	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
52	P I	2771	760	493	3721	462	50	145	35	149	16	23.8	1.1	3.0	8.4	5.7	12.9
	P II	4400	737	494	3756	474	50	143	34	137	15	21.9	0.8	2.2	8.4	4.3	12.8
	EXP I	2850	48	301	2004	502	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2550	56	299	2003	499	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2788	855	435	3212	428	53	116	32	132	16	21.1	1.0	2.5	7.5	4.6	11.2
	REC II	3473	1044	644	4936	630	51	178	32	184	15	29.4	1.3	3.4	9.9	6.2	13.8
	REC III	5025	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	(2)	(3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
53	P I	2317	613	371	2858	340	48	111	35	118	16	18.9	0.8	2.3	7.1	4.4	10.9
	P II	3338	570	329	2507	307	49	99	36	95	15	15.2	0.4	1.4	6.2	2.9	9.3
	EXP I	3117	20	111	997	0	0	75	70	75	30	10.7	0.0	0.6	1.2	1.1	0.0
	EXP II	2850	10	111	997	0	0	75	70	75	30	9.9	0.0	0.6	1.2	1.1	0.0
	REC I	2612	810	367	2691	384	57	83	28	116	17	18.6	0.9	2.3	6.5	4.3	9.9
	REC II	2263	751	427	3324	420	51	111	30	136	16	21.8	1.1	2.8	7.4	5.4	10.6
	REC III	3350	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
54	P I	2438	677	423	3182	386	48	132	37	123	16	19.7	0.7	2.1	7.4	4.1	11.3
	P II	3554	686	445	3446	416	48	134	35	126	15	20.2	0.5	1.8	7.9	3.4	12.0
	EXP I	2950	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2850	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	3525	750	364	2686	368	55	89	30	117	17	18.7	0.9	2.3	6.6	4.3	9.9
	REC II	3333	1132	674	5352	678	51	175	29	196	15	31.4	1.3	3.5	11.2	6.2	15.9
	REC III	4500	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
55	P I	2233	654	368	2818	320	45	118	38	122	17	19.5	0.8	2.3	7.2	4.4	11.0
	P II	2733	664	360	2734	310	45	119	39	113	16	18.1	0.5	1.6	6.8	3.1	10.4
	EXP I	3088	140	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.4	2.1	0.1
	EXP II	2700	140	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.4	2.1	0.1
	REC I	2688	858	418	3104	413	53	110	32	129	17	20.6	0.9	2.5	7.6	4.5	11.2
	REC II	3021	1086	538	4417	478	43	157	32	202	18	32.3	1.2	3.4	11.1	6.3	15.4
	REC III	3800	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
56	P I	2642	755	489	3708	465	50	140	34	148	16	23.7	1.1	3.0	8.4	5.6	13.1
	P II	4408	738	528	4007	521	52	148	33	139	14	22.2	0.8	2.3	9.1	4.4	13.7
	EXP I	5988	40	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.5	2.1	0.1
	EXP II	5550	20	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.5	2.1	0.1
	REC I	3325	872	440	3259	432	53	118	32	134	16	21.4	1.0	2.6	7.7	4.6	11.4
	REC II	3582	1325	765	6062	770	51	199	30	219	14	35.0	1.5	4.0	12.4	7.1	17.3
	REC III	5550	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
57	P I	2433	698	433	3268	406	50	130	36	123	15	19.7	0.6	1.9	7.2	3.4	11.1
	P II	3650	665	507	3789	494	52	147	35	131	14	21.0	0.6	1.8	8.5	3.2	12.4
	EXP I	3046	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	EXP II	2850	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	REC I	2488	819	370	2722	379	56	89	29	115	17	18.4	0.9	2.2	6.5	4.2	9.9
	REC II	3141	1128	684	5283	690	52	178	30	195	15	31.2	1.1	3.2	10.2	5.6	13.9
	REC III	4675	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
58	P I	2429	715	500	3857	484	50	139	32	148	15	23.7	1.1	3.0	8.5	5.6	13.2
	P II	3354	336	198	1485	223	60	44	27	41	11	6.6	0.3	0.9	3.0	1.5	4.2
	EXP I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
59	P I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	P II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	EXP I	2460	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	EXP II	3150	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	REC I	3150	790	423	3154	408	52	116	33	133	17	21.3	0.9	2.6	7.6	4.6	11.2
	REC II	2684	1034	635	4719	665	56	162	31	152	13	24.3	1.0	2.8	8.6	4.9	11.6
	REC III	4275	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
60	P I	2575	571	357	2598	344	53	102	35	100	15	16.0	0.8	2.1	5.4	4.2	8.3
	P II	3788	594	355	2668	346	52	102	34	93	14	14.9	0.6	1.7	5.6	3.5	8.2
	EXP I	3600	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.6	0.2	5.5
	EXP II	3450	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.6	0.2	5.5
	REC I	3600	834	415	3075	408	53	110	32	127	16	20.3	1.0	2.5	7.4	4.5	10.5
	REC II	3112	856	501	4160	503	48	133	29	138	13	22.1	1.0	2.6	8.0	4.7	10.7
	REC III	5275	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
61	P I	2621	695	486	3628	488	54	129	32	135	15	21.6	1.2	3.2	7.8	6.1	12.1
	P II	3746	737	488	3655	467	51	143	35	133	15	21.3	0.7	2.2	8.2	4.2	12.2
	EXP I	2658	126	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	EXP II	2700	126	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	REC I	2112	826	379	2772	390	56	90	29	118	17	18.9	0.9	2.3	6.6	4.4	10.1
	REC II	2726	950	615	4837	603	50	169	31	176	15	28.2	1.3	3.4	9.8	6.2	13.5
	REC III	4063	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
62	P I	2775	786	561	4123	560	54	149	32	161	16	25.8	1.5	3.8	9.0	7.2	13.8
	P II	4425	760	574	4319	585	54	154	32	143	13	22.9	0.8	2.4	9.2	4.5	14.2
	EXP I	3900	126	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	EXP II	3300	126	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	REC I	3600	827	379	2770	390	56	90	29	118	17	18.9	0.9	2.3	6.7	4.4	10.1
	REC II	3648	1026	575	4354	572	53	154	32	163	15	26.1	1.0	2.9	9.3	5.3	13.1
	REC III	6750	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
63	P I	3862	538	509	3743	554	59	119	29	119	13	19.0	1.5	3.5	7.8	6.9	12.0
	P II	5433	560	558	3921	626	64	132	30	100	10	16.0	0.8	2.0	8.1	3.8	12.4
	EXP I	5750	179	271	2015	268	53	76	34	71	14	11.4	0.2	0.7	3.4	1.9	3.2
	EXP II	5250	179	271	2015	268	53	76	34	71	14	11.4	0.2	0.7	3.4	1.9	3.2
	REC I	4950	862	437	3232	428	53	117	32	133	16	21.3	1.0	2.6	7.6	4.6	11.2
	REC II	5910	1314	768	6082	808	53	187	28	202	13	32.0	1.6	4.1	13.3	7.5	17.8
	REC III	7800	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
64	P I	3800	799	608	4591	601	52	165	32	173	15	27.7	1.5	3.9	10.1	7.3	15.6
	P II	5850	760	573	4334	566	52	162	34	147	14	23.5	0.8	2.4	9.5	4.6	14.2
	EXP I	5617	179	271	2015	268	53	76	34	71	14	11.4	0.2	0.7	3.4	1.9	3.2
	EXP II	4800	179	271	2015	268	53	76	34	71	14	11.4	0.2	0.7	3.4	1.9	3.2
	REC I	5588	862	431	3194	417	52	118	33	132	16	21.1	1.0	2.6	7.7	4.6	11.3
	REC II	4984	1132	689	5470	689	50	180	30	202	15	32.3	1.5	4.0	11.4	6.7	15.9
	REC III	7675	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
65	P I	3350	810	751	5765	794	55	186	29	185	13	29.6	1.6	4.0	12.2	7.4	18.7
	P II	5512	734	723	5551	764	55	184	30	165	12	26.4	0.9	2.6	11.4	4.8	17.3
	EXP I	3550	233	407	3016	401	53	115	34	105	14	16.8	0.3	1.1	4.1	2.4	4.5
	EXP II	2850	233	407	3016	401	53	115	34	105	14	16.8	0.3	1.1	4.1	2.4	4.5
	REC I	3150	860	435	3224	428	53	116	32	133	15	21.3	1.0	2.6	7.6	4.6	11.3
	REC II	3584	1129	700	5869	678	46	197	30	201	14	32.2	1.2	3.5	12.1	6.2	16.7
	REC III	4600	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
66	P I	3279	782	635	4801	658	55	159	30	170	14	27.2	1.6	3.9	10.2	7.6	15.8
	P II	5629	760	619	4650	625	54	170	33	151	13	24.2	0.8	2.4	9.9	4.6	15.1
	EXP I	4200	233	407	3016	401	53	115	34	105	14	16.8	0.3	1.1	4.1	2.4	4.5
	EXP II	3750	233	407	3016	401	53	115	34	105	14	16.8	0.3	1.1	4.1	2.4	4.5
	REC I	3900	864	437	3237	428	53	117	32	133	16	21.3	1.0	2.7	7.6	4.7	11.3
	REC II	4555	1334	627	4975	604	49	168	30	206	17	33.0	1.3	3.5	10.6	7.0	15.1
	REC III	4550	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
67	P I	2846	736	497	3715	479	52	139	34	148	16	23.7	1.3	3.3	8.3	6.2	12.8
	P II	3508	713	424	3274	387	47	130	36	128	16	20.5	0.8	2.2	7.4	4.1	11.1
	EXP I	1370	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2367	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	3600	687	330	2450	332	54	82	30	106	17	17.0	0.8	2.2	6.2	4.1	9.3
	REC II	3398	1153	682	5251	655	50	187	32	218	17	34.9	1.5	3.9	11.5	6.9	16.0
	REC III	5463	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
68	P I	2608	750	496	3785	467	49	145	34	149	16	23.8	1.1	3.0	8.6	5.6	13.2
	P II	2829	716	412	3174	382	48	123	35	126	16	20.2	0.7	2.0	7.2	3.9	11.0
	EXP I	1255	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	2300	829	430	3180	426	53	114	32	128	16	20.5	1.0	2.5	7.2	4.5	10.8
	REC II	4582	1196	653	4965	616	50	185	34	209	17	33.4	1.2	3.3	10.5	6.0	14.4
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
69	P I	2638	762	494	3715	462	50	146	35	147	16	23.5	1.0	2.8	8.4	5.4	13.0
	P II	3900	732	418	3211	375	47	131	37	129	16	20.6	0.7	2.1	7.4	4.2	11.2
	EXP I	1345	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2400	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2862	717	356	2624	364	55	86	29	112	17	17.9	0.9	2.3	6.2	4.2	9.4
	REC II	3460	1162	718	5532	676	49	207	34	222	16	35.5	13.5	3.8	11.6	6.8	16.4
	REC III	4438	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
70	P I	2904	775	594	4452	605	54	155	31	158	14	25.3	1.3	3.3	9.5	6.3	14.8
	P II	3817	681	529	3983	544	55	142	32	124	12	19.8	0.8	2.2	8.4	4.2	12.7
	EXP I	1585	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	2262	833	430	3182	426	53	114	32	128	16	20.5	1.0	2.5	7.3	4.5	10.8
	REC II	2796	1100	720	5510	732	53	190	31	188	14	30.1	1.6	4.0	9.9	6.6	14.0
	REC III	4800	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
71	P I	2508	765	501	3773	472	50	146	35	151	16	24.2	1.1	3.1	8.6	5.8	13.2
	P II	3579	736	426	3281	381	46	134	37	132	16	21.1	0.8	2.2	7.6	4.3	11.6
	EXP I	1285	18	151	997	252	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2667	28	149	1000	249	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	3150	780	365	2682	382	57	84	28	112	17	17.9	0.9	2.3	6.2	4.2	9.5
	REC II	3472	1286	751	5919	719	49	212	32	226	15	36.2	1.4	4.0	12.4	7.1	17.5
	REC III	4450	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
72	P I	2158	679	466	3448	470	55	126	33	119	14	19.0	1.1	2.7	7.5	5.3	11.4
	P II	3617	617	441	3367	439	52	123	33	111	13	17.8	0.8	2.1	7.2	4.1	10.5
	EXP I	1365	18	151	997	252	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2250	28	149	1000	249	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	2538	775	355	2594	374	57	80	28	109	17	17.4	0.8	2.2	6.2	4.2	7.8
	REC II	3266	1185	584	5624	756	54	175	28	206	15	33.0	1.4	3.7	11.2	7.2	15.7
	REC III	4138	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
73	P I	1996	751	437	3370	400	48	130	35	141	17	22.6	1.0	2.7	7.8	4.9	12.1
	P II	2946	694	387	2976	351	47	118	36	122	16	17.5	0.7	2.0	6.9	3.6	10.5
	EXP I	1375	37	303	2002	505	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	2542	56	299	2003	499	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	3000	697	326	2455	296	48	100	37	100	16	16.0	0.5	1.5	6.5	2.4	9.5
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
74	P I	2258	743	495	3722	475	51	140	34	147	16	23.5	1.1	2.8	8.2	5.3	12.5
	P II	3800	649	239	1954	229	47	67	31	72	15	11.5	0.4	1.0	4.1	1.8	5.9
	EXP I	1740	37	303	2002	505	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	EXP II	1500	56	299	2003	499	100	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
	REC I	3600	820	422	3110	422	54	110	32	125	16	20.0	1.0	2.4	7.0	4.5	10.6
	REC II	3313	1371	429	5388	582	43	178	30	217	16	34.7	1.2	3.5	11.2	6.1	15.8
	REC III	4413	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
75	P I	2758	751	465	3526	434	49	137	35	141	16	22.6	1.1	2.9	7.8	5.4	12.0
	P II	3575	739	410	3155	363	46	132	38	125	16	20.0	0.6	2.0	7.3	3.8	11.0
	EXP I	1400	20	111	997	0	0	75	70	75	30	12.1	0.0	0.6	1.2	1.1	0.0
	EXP II	2700	10	111	997	0	0	75	70	75	30	12.1	0.0	0.6	1.2	1.1	0.0
	REC I	3150	810	349	2567	352	55	87	30	108	17	17.3	0.8	2.0	5.9	3.6	9.1
	REC II	2917	1259	660	4818	610	51	192	36	216	18	33.4	1.6	3.8	11.5	7.1	16.2
	REC III	4125	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
76	P I	2154	693	410	3111	373	48	130	38	116	15	18.6	0.7	1.9	6.9	3.4	10.4
	P II	3004	687	381	2885	369	51	111	35	100	14	16.0	0.4	1.4	6.2	2.6	9.0
	EXP I	1440	20	111	997	0	0	75	70	75	30	12.1	0.0	0.6	1.2	1.1	0.0
	EXP II	2117	10	111	997	0	0	75	70	75	30	12.1	0.0	0.6	1.2	1.1	0.0
	REC I	1725	785	318	2374	316	53	82	31	98	16	15.7	0.6	1.5	5.6	2.7	8.5
	REC II	2502	1159	598	4784	553	46	180	34	179	15	28.6	0.8	2.6	10.9	4.1	14.7
	REC III	4700	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
77	P I	2758	673	379	2803	357	51	110	35	115	16	18.4	0.7	2.1	6.2	3.6	9.7
	P II	3262	698	378	2714	352	48	111	34	118	16	18.9	0.7	2.0	6.4	3.6	9.7
	EXP I	900	140	223	1993	0	0	151	70	149	30	23.8	0.0	2.4	2.4	2.1	0.1
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
78	P I	1833	717	469	3504	435	50	141	36	140	16	22.4	1.0	2.8	8.2	5.2	12.7
	P II	3546	750	491	3693	464	50	146	36	138	15	22.1	0.8	2.3	8.3	4.4	12.6
	EXP I	1440	127	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.4	2.1	0.1
	EXP II	2700	20	223	1993	0	0	151	70	149	30	23.8	0.0	1.2	2.4	2.1	0.1
	REC I	2325	842	432	3198	428	53	114	32	131	16	21.0	0.9	2.5	7.6	4.6	11.2
	REC II	2726	1234	709	5480	700	51	190	31	208	15	33.3	1.4	3.7	11.0	6.8	15.5
	REC III	3225	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
79	P I	3750	759	491	3815	461	48	143	34	150	16	24.0	1.0	2.9	8.6	5.5	13.4
	P II	4504	705	390	2908	358	49	120	37	115	16	18.4	0.7	1.9	6.8	3.8	10.0
	EXP I	1425	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	EXP II	2700	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	REC I	4950	824	376	2756	387	56	89	29	118	17	18.9	0.9	2.3	6.6	4.4	10.0
	REC II	4104	1466	622	4851	598	49	169	31	202	17	32.3	1.0	3.1	10.1	5.9	14.3
	REC III	5438	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
80	P I	2808	717	498	3730	489	52	138	33	139	15	22.2	1.0	2.7	8.2	5.1	12.8
	P II	3517	632	447	3257	446	55	124	34	114	14	18.2	0.7	2.0	7.2	3.8	11.0
	EXP I	1415	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	EXP II	2650	23	126	1000	46	18	89	80	8	3	1.3	0.0	0.2	1.8	0.1	2.8
	REC I	2700	824	376	2766	389	56	88	29	118	17	18.9	0.9	2.3	6.6	4.4	10.0
	REC II	2950	978	659	5018	687	55	163	29	176	14	28.2	1.4	3.5	8.6	6.1	12.3
	REC III	4500	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	Water, ml (2)	Water, ml (3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
81	P I	3175	742	449	3459	428	50	124	32	145	17	23.2	1.1	3.0	7.6	5.3	11.8
	P II	4204	731	461	3424	436	51	135	35	134	16	21.4	0.8	2.2	7.6	3.9	12.5
	EXP I	1425	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	EXP II	2700	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	REC I	3400	820	413	3015	428	57	99	29	122	16	19.5	1.0	2.5	6.5	4.5	9.8
	REC II	4041	1052	565	4581	503	44	169	33	202	18	32.3	1.3	3.6	9.0	6.2	13.0
	REC III	5400	0	0	00	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
82	P I	2545	721	536	3945	542	55	142	32	143	14	22.9	1.2	3.0	8.4	5.6	12.9
	P II	2750	604	370	2912	380	52	100	31	86	12	13.8	0.4	1.1	5.3	2.2	8.2
	EXP I	1430	47	254	2005	94	18	179	80	14	3	2.2	0.0	0.4	3.5	0.2	5.5
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
83	P I	3617	744	467	3515	427	49	143	37	140	16	22.4	0.9	2.7	8.2	5.0	12.6
	P II	3542	728	432	3320	388	47	135	37	133	16	21.3	0.8	2.2	7.5	4.0	11.4
	EXP I	1430	104	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	EXP II	2700	96	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	REC I	2700	828	392	2876	400	56	96	30	119	16	19.0	0.9	2.4	6.7	4.4	10.1
	REC II	3474	1135	658	5157	629	49	184	32	205	16	32.8	1.5	3.8	10.9	6.5	15.4
	REC III	5263	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
84	P I	2458	731	482	3603	456	51	140	35	142	16	22.7	1.0	2.8	8.2	5.3	12.7
	P II	3325	730	438	3326	402	48	133	36	132	16	21.1	0.8	2.2	7.6	4.1	11.5
	EXP I	1440	86	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	EXP II	2692	96	137	1014	135	53	38	34	35	14	5.6	0.0	0.3	2.1	0.8	1.9
	REC I	3150	820	375	2752	386	56	89	29	117	17	18.7	0.9	2.3	6.6	4.4	10.0
	REC II	3826	1159	650	5049	624	49	180	32	202	16	32.3	1.5	3.8	10.7	6.9	15.1
	REC III	5900	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

MEAN DAILY NUTRIENT INTAKES FOR INDIVIDUAL SUBJECTS

Subject Code No.	Periods	Water, ml (1)*	(2)	(3)	Cal	CHO gm	CHO %Cal	Fat gm	Fat %Cal	PRO gm	PRO %Cal	PROT N gm	Ca gm	P gm	Na gm	K gm	Cl gm
85	P I	2242	754	485	3682	450	49	145	35	145	16	23.2	1.0	2.7	8.4	5.1	13.0
	P II	3117	716	394	3104	344	44	126	37	128	16	20.5	0.8	2.1	7.2	4.0	10.9
	EXP I	1640	113	271	2015	268	53	76	34	71	14	11.4	1.1	0.7	3.4	1.9	3.2
	EXP II	2700	96	271	2015	268	53	76	34	71	14	11.4	0.1	0.7	3.4	1.9	3.2
	REC I	2712	852	432	3200	424	53	115	32	132	16	21.1	0.9	2.5	7.6	4.6	11.3
	REC II	3644	1038	555	4525	505	45	162	32	191	17	30.6	1.3	3.4	10.2	6.2	14.3
	REC III	4725	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
86	P I	2131	877	419	3154	394	50	119	34	136	17	21.8	1.0	2.7	6.9	5.2	10.8
	P II	3546	596	417	3333	384	46	124	34	132	16	21.1	0.7	2.0	7.4	3.9	11.1
	EXP I	1385	113	271	2015	268	53	76	34	71	14	11.4	0.2	0.7	3.4	1.9	3.2
	EXP II	2700	96	271	2015	268	53	76	34	71	14	11.4	0.2	0.7	3.4	1.9	3.2
	REC I	2838	864	436	3230	428	53	116	32	134	16	21.4	1.0	2.6	7.7	4.6	10.8
	REC II	3254	1020	575	4403	551	50	161	33	177	16	28.3	1.2	3.3	9.2	5.9	12.8
	REC III	6000	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
87	P I	2933	796	562	4287	545	51	159	33	157	15	25.1	1.1	3.0	9.5	5.6	14.6
	P II	3742	734	511	3902	500	51	145	33	137	14	21.9	0.7	2.1	8.6	3.9	13.1
	EXP I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
88	P I	2408	746	479	3641	442	49	149	37	132	14	21.1	0.6	1.9	8.2	3.5	12.5
	P II	3688	705	484	3667	473	52	137	34	131	14	21.0	0.7	2.0	7.9	3.8	12.1
	EXP I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	EXP II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC I	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC II	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----
	REC III	----	---	---	----	---	--	---	--	---	--	----	---	---	---	---	----

APPENDIX IV

CASE HISTORIES

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In this section a brief digest will be presented of the clinical observations made on each of the 100 volunteer airmen during their 36 days of participation in the summer tests. The notes will be presented by flights and periods so that reference may be readily made to concurrent biochemical and physiological data detailed elsewhere in this report.

Subject 30 was ill during the pre- and experiment periods and spent most of his time in Sick Bay or at Fort Benjamin Harrison. In PRE II No. 93 became subject 30 and when the former subject returned to the project in REC I, he was identified as No. 102.

Included in these clinical notes are results of special clinical examinations on blood and urine made when the subjects became ill.

These case histories were prepared by Dr. R. L. Kosmala from the subject-records of the medical officers.

Flight 1

Subject 1. White male, aged 17 years. Past history of multiple fractures and loss of 4 teeth. Physical exam on 20 June essentially normal. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a mild pharyngitis.

Experimental period: On 3rd day subject complained of light-headedness and abdominal pain. On 5th day he experienced abdominal cramps post heat test. He was weak and became dizzy on standing on 6th day. From 7th to 10th days he was still weak and dizzy, and experienced blurring and dimming of vision for several minutes on standing. There was some narrowing of visual fields. On 9th day he was taken off experimental regimen and given 2000 ml of 5% D/S plus 1000 ml of 5% D/W. On 10th day he was given 300,000 units of penicillin. Physical exam on 15 July revealed narrowed visual fields and slightly hypoactive knee and ankle jerks.

Recovery period: Residual restriction of visual fields for first three days. Penicillin for first two days, 300,000 units. From 4th to 6th days he experienced abdominal cramps and pain which were intensified by exercise. He was given 4.5 gm of NaCl on 6th day. Physical exam on 26 July revealed slightly hypoactive knee jerks.

Subject 2. White male, aged 19 years. Past history is non-contributory. Physical exam on 20 June revealed slight inflamed tonsils. X-ray negative.

Pre-period: Uneventful except for a mild anorexia on 2nd day. Physical exam on 4 July revealed a sore left wrist and slightly hypoactive knee jerks.

Experimental period: On the 3rd day he complained of dizziness on standing, periumbilical pain shifting to LLQ, and some nausea and regurgitation of small amount of gastric content. From 4th to 8th days he complained of tender enlarged generalized nodes and shifting abdominal pains.

On the 3rd day the WBC was 7,500; differential showed 64% polymorphonuclear leukocytes (11% stab cells), 31.5% lymphocytes, 3% monocytes, 1% eosinophils, and 0.5% basophils. On the 4th day the WBC was 8,500 with 66% polymorphonuclear leukocytes (5% stab cells) and 34% lymphocytes (8% "atypical"). The ESR was 0.12 mm/min and the hematocrit 52.5%. At the time of an incomplete three-hour test that day, the oral temperature was 97.2°F and the respiratory rate was 32.

The impression was infectious mononucleosis. The experimental regimen was discontinued and he was given 1000 ml of 5% D/S and 1000 ml of 5% D/W. On 9th day he was air-evacuated to Chanute AFB. There the clinical impression was the same. Laboratory work was negative and the heterophile agglutination was titer 1:7. On 19 July subject was asymptomatic and was sent back to Camp Atterbury where he arrived on 20 July.

Recovery period: Subject returned to Camp Atterbury on 5th day of recovery period. On 8th day he complained of headache and backache. On 9th day he had general adenopathy with LUQ pain post-heat test. At this time the WBC was 6,050 and the differential showed 35% polymorphonuclear leukocytes, 60% lymphocytes (6% "atypical" cells), 3% monocytes, and 2% eosinophils. Physical exam on 26 July revealed a general abdominal tenderness to deep palpitation which was more marked in LUQ. He had bilaterally enlarged inguinal and axillary nodes, and knee and ankle jerks were slightly hypoactive.

Subject 3. White male, aged 17 years. Past history is non-contributory. Physical exam on 20 June revealed dental caries. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed small patches of echymoses on lt. shoulder, rt. thigh, and lt. buttock.

Experimental period: Complained of dizziness on standing on 3rd day. From 5th to 8th days complained of abdominal pains and cramps precipitated by heat test on 5th day. On evening of 6th day he developed dull heavy feeling in lt. chest and he was taken off experimental regimen. At this time a water diuresis test was done; the recovery was 53.8%. Physical exam on 15 July revealed slight redness around both eyes, thickly furred tongue, and enlarged tonsils.

Recovery period: Six days after early termination of experimental period he experienced headache and postprandial gastric burning, and had a cough. On 12th day he experienced severe burning stomach pain which was relieved by Amphogel. Physical exam on 26 July revealed enlarged tonsils and tonsillar nodes, and slight hypoactive knee and ankle jerks.

Subject 4. White male, aged 18 years. Past history is non-contributory. Physical exam on 20 June revealed dental caries. X-ray negative.

Pre-period: He complained of nausea on 4th day and abdominal pain on 10th day. Physical exam on 4 July revealed a mild pharyngitis, and slightly hyperactive knee and ankle jerks.

Experimental period: Complained of chest pain on breathing during 3rd and 4th days. There was a questionable pleural friction rub on left ant. chest wall. He was given penicillin, 300,000 units. From 5th to 8th day he had abdominal pains which were precipitated by heat test on 5th day, during which test he collapsed at end of 10th lap. On 6th day he was taken off experimental regimen. At this time he was given a water diuresis test; the recovery was 58.1%. Physical exam on 15 July revealed slight furring of tongue, and slightly hyperactive knee jerks.

Recovery period: On 2nd day (six days after early termination) he complained of headache and abdominal pain. On 4th day he had a headache. On 8th day he experienced a burning stomach. Physical exam on 26 July revealed a mild pharyngitis and a slight aciniform eruption on face.

Subject 5. White male, aged 21 years. Past history of 2-3 sore throats each year. Physical exam on 20 June revealed a Grade II systolic murmur best heard at 3rd interspace parasternally, and heart enlarged to left anterior axillary line. Knee and ankle jerks slightly hyperactive. X-ray negative.

Pre-period: Complained of nausea on 10th day. Physical exam on 4 July revealed a Grade II systolic murmur and slight hyperactive knee and ankle jerks.

Experimental period: Subject had occasional episodes of lightheadedness on 3rd day. On 5th, 6th, and 8th days he complained of abdominal pain which was accentuated bv food. On 9th day he had a mild pharyngitis, and abdominal cramps accentuated by eating. He was air-evacuated to Chanute AFB, and physical exam there on 15 July was essentially negative except for abdominal cramps. Impression was suspected gastritis. No special diagnostic tests were performed. Subject was observed in hospital for 5 days and then returned to Camp Atterbury.

Recovery period: He returned to Camp Atterbury on 5th day of recovery period. Rest of period was uneventful. Physical exam on 26 July revealed a mild inflammation of pharynx, and a chronic inflammation of dental margin.

Subject 6. White male, aged 20 years. Past history of a questionable malaria attack at age 14 years. Physical exam 20 June revealed hyperactive knee and ankle jerks. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a maculopapular rash on buttocks.

Experimental period: Complained of sore leg muscles on 5th and 6th days. Physical exam on 15 July essentially normal.

Recovery period: On 6th day complained of abdominal fullness and chronic thirst. Physical exam on 26 July revealed slight hypoactive knee and ankle jerks.

Subject 7. White male, aged 18 years. Past history is non-contributory. Physical exam on 20 June revealed dental caries, slight pigeon breast, and slight hyperactive knee and ankle jerks. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a slight pigeon breast.

Experimental period: On 3rd day subject complained of weakness and lightheadedness. He had a headache on 4th day. Physical exam on 15 July revealed a slightly infected sclera, slight pigeon breast, and slightly hyperactive knee and ankle jerks.

Recovery period: Uneventful. Physical exam on 26 July revealed poor oral hygiene with need for prompt dental attention.

Subject 8. White male, aged 17 years. Past history bleeding gums on slight trauma. T and A in 1953. Physical exam on 20 June revealed a mild athlete's foot. X-ray negative.

Pre-period: Complained of headache on 4th day. On 12th and 13th days he had a heat rash on the genitalia. Physical exam on 4 July revealed knee and ankle jerks slightly hypoactive.

Experimental period: Subject complained of abdominal pain on 2nd day. On 3rd day he had a severe episode of hysterical hyperventilation with sobbing, carpopedal spasm, and bilateral median nerve palsy. On 4th complained of heat rash on buttocks. Physical exam on 15 July revealed slight hypoactive knee jerks.

Recovery period: Complained of headaches on 2nd and 4th day with heat rash on 4th day. Physical exam on 26 July revealed slight hyperactive knee and ankle jerks.

Subject 9. White male, aged 17 years. Past history is non-contributory. Physical exam on 20 June essentially negative. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July essentially negative.

Experimental period: Subject complained of nausea on 3rd day. On 5th and 6th days he complained of weakness. On 8th day he again felt nauseated. Physical exam on 15 July revealed a slight epidermophytosis of feet.

Recovery period: Uneventful. Physical exam on 26 July essentially normal.

Subject 10. Negro male, aged 19 years. Past history of gonorrhea in 1953 which was treated with penicillin without a reaction. Physical exam on 20 June revealed dental caries. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed slight hypoactive knee and ankle jerks.

Experimental period: Subject had a cough on second day. He was weak and lightheaded on 3rd day. On 4th day he complained of backache and on 8th day had chest pains. Physical exam on 15 July revealed slight LLQ soreness, severe bilateral epidermophytosis, and slight hypoactive knee and ankle jerks.

Recovery period: On 4th day subject complained of a headache. He had burning abdominal pain on 8th day which was treated with Amphogel. Physical exam on 26 July was essentially normal.

Subject 11. White male, aged 20 years. Past history is non-contributory. Physical exam on 20 June revealed a mild case of epidermophytosis and slightly hypoactive knee jerks.

Pre-period: Uneventful. Physical exam on 4 July revealed enlarged tonsils and tonsillar nodes, maculo-papular rash on buttocks, and slightly hypoactive knee and ankle jerks.

Experimental period: Subject complained of nausea on 3rd day, and sore feet on 4th day. On 7th day he had a sore mouth. Physical exam on 15 July revealed enlarged tonsils and tonsillar nodes, Vincent's angina, a mild case of epidermophytosis, and slightly hypoactive knee and ankle jerks.

Recovery period: From 5th to 8th day he complained of heartburn. On 11th day he complained of sore throat and heat rash. Physical exam on 26 July revealed a mild pharyngitis, rash on both buttocks, and slightly hypoactive knee and ankle jerks.

Subject 12. White male, aged 18 years. Past history is non-contributory. Physical exam on 20 June revealed a mild nasal congestion. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed slight aciniform eruption on face, and a chronic macular rash on buttocks.

Experimental period: From 6th to 9th days he complained of rt. sore knee. On 10th day he was coughing. Physical exam on 15 July revealed sore gums, furuncle on rt. side of neck with tender rt. nodes, few rales at pulmonary apices, and slightly hypoactive knee and ankle jerks.

Recovery period: Subject complained of coughing on first three days. He had a headache on 7th day. Physical exam on 26 July revealed poor oral hygiene and the need for dental attention, moderate aciniform eruption on face, red rash over shoulders and buttocks, and slightly hypoactive knee and ankle jerks.

Subject 13. White male, aged 18 years. Past history of T and A as a child and an injured right elbow. Physical exam on 20 June was essentially normal. X-ray negative.

Pre-period: He complained of nausea on 10th day. Physical exam on 4 July essentially negative.

Experimental period: Subject experienced weakness on 3rd day. He complained of nausea and burning stomach on 5th day, and loose stools on 6th day. On 8th day he had a backache. On 9th day he had a headache and abdominal pain with a sudden onset of fever and malaise. He was given penicillin, 300,000 units, acromycin, 500 mg IM, and compound F, 100 mg IV. On this day the differential showed 70% polymorphonuclear leukocytes (9% stab cells), 12% lymphocytes, 9% monocytes and 1% myeloblast. He was air-evacuated to Chanute AFB on 13 July and a physical exam on 15 July revealed wheezes in lt. post, lt. axillary, and lt. ant. base lung fields. There were non-tender axillary and inguinal nodes. Impression was left lower lobe pneumonia. X-ray revealed a left lower lobe bronchopneumonia. On 18 July the lungs were clear. X-ray on 20 July showed almost complete

clearing resolution of the bronchopneumonia. Subject was discharged on 25 July after 10 days of hospitalization.

Subject 14. Negro male, aged 20 years. Past history is non-contributory. Physical exam on 20 June revealed slightly enlarged tonsils and grade II apical systolic murmur. X-ray negative.

Pre-period: Subject complained of headache on 4th day. Physical exam on 4 July essentially negative.

Experimental period: He complained of headache on 2nd, 6th, and 8th days. Physical exam on 15 July essentially negative.

Recovery period: Complained of headache on 9th day. Physical exam on 26 July revealed a mild aciniform eruption on face.

Subject 15. Negro male, aged 17 years. Past history of T and A as a child, and a fractured lt. ankle in 1953. Physical exam on 20 June revealed bilateral striae in anterior axillary areas, and bilaterally absent knee and ankle jerks. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed slightly hypoactive knee and ankle jerks.

Experimental period: Uneventful. Physical exam on 15 July revealed slightly hypoactive knee and ankle jerks.

Recovery period: On 2nd day he complained of headache and dysuria. On 3rd day he complained of dysuria and had an enlarged rt. seminal vesicle. On 4th day he had a sudden onset of fever during three-hour test which quickly rose to 100°F and remained there. He was air-evacuated to Chanute AFB where a physical exam on 20 July revealed a bilateral otitis, moderately inflammed pharynx, and enlarged rt. seminal vesicle. Impression was bilateral otitis media, acute pharyngitis, and rt. seminal vesiculitis. On 20 July an X-ray was essentially negative. Subject was discharged from hospital on 23 July.

Subject 16. Negro male, aged 17 years. Past history is non-contributory. Physical exam on 20 June revealed a thickening of skin over knees and slightly hypoactive knee and ankle jerks. X-ray negative.

Pre-period: Subject complained of lower abdominal pain on first day. Physical exam on 4 July revealed slightly hypoactive knee and ankle jerks.

Experimental period: On first day he vomited breakfast, and on second day had a headache. Complained of LLQ pain on 4th day. On 7th day he had a headache, sore throat, and cough. A blood count was made. The WBC was 10,020 and the differential showed 59% polymorphonuclear leukocytes (8% stab cells), 37% lymphocytes, 3% monocytes, and 1% eosinophils. On 8th day he had abdominal tenderness and a fever. He was given penicillin, 1,000,000 units. On 9th day he was air-evacuated to Chanute AFB, and physical exam on 15 July revealed moderately inflammed pharynx, harsh breath sounds over rt. lung base, and medium inspiratory and expiratory rales on right. Impression was pneumonitis of rt. lung. On 18 July an X-ray was

negative and subject had minimal rales over both lower lungs. On 20 July X-ray and physical exams were negative. Subject was discharged from hospital on 22 July.

Subject 17. White male, aged 17 years. Past history of left inguinal hernia repair in 1949, and fractured lt. clavicle in 1952. Physical exam on 20 June essentially normal. X-ray negative.

Pre-period: Complained of headache and anorexia on 8th day. On 9th day he had a cough and anorexia. On 10th day admitted to Sick Bay with a diagnosis of viral pneumonia. On the 11th day the WBC was 10,300 and the differential showed 56% polymorphonuclear leukocytes, 40% lymphocytes, 2% monocytes, and 2% eosinophils. He was placed on aureomycin, 250 mg per day. Physical exam on 4 July essentially negative.

Experimental period: Uneventful. Physical exam on 15 July revealed slightly hypoactive knee and ankle jerks.

Recovery period: Uneventful except for burning eyes on 3rd day. Physical exam on 26 July revealed a red rash on buttocks.

Subject 18. White male, aged 19 years. Past history is non-contributory. Physical exam on 20 June revealed slightly hypoactive knee jerks. X-ray negative.

Pre-period: Complained of heartburn on first day. Physical exam on 4 July revealed a mild aciniform eruption on face.

Experimental period: Complained of abdominal pain on 2nd day. He had postprandial suprapubic pain on 4th day. Physical exam on 15 July revealed a probable abscess rt. lower molar, and slightly hypoactive knee jerks.

Recovery period: Complained of headache on 10th day. Physical exam on 26 July revealed a mild aciniform eruption on face.

Subject 19. White male, aged 19 years. Past history of occasional sore throats. Physical exam on 20 June revealed slightly hypoactive rt. knee jerk. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July essentially negative.

Experimental period: He complained of sore throat on 4th day. He was slightly nauseated on 5th day. On tenth day he had abdominal cramps. Physical exam on 15 July was essentially normal.

Recovery period: From 6th to 10th days had a bilateral otitis externa which progressed to involve middle ear and mastoid. He was treated with penicillin, 600,000 units; bicillin, 1,200,000 units; and Neocortef. On 10th day he was sent to Bartholomew County Hospital.

Subject 20. Negro male, aged 21 years. Past history is non-contributory. Physical exam on 20 June revealed a mild thickening of skin over knees. X-ray negative.

Pre-period: He complained of coughing on 2nd day. Physical exam on 4 July revealed slightly hypoactive knee and ankle jerks.

Experimental period: On 8th day he complained of supraorbital headaches, bilateral shoulder pain, and diffuse upper abdominal pain. He developed a sudden fever in the evening and was given penicillin, 2,000,000 units and 1000 cc 5% D/S. At this time the WBC was 6,750 and the differential showed 57% polymorphonuclear leukocytes, 36% lymphocytes, 5% monocytes, and 2% eosinophils. On the 9th day he was air-evacuated to Chanute AFB. Physical exam on 15 July revealed expiratory wheezes in rt. post. lung area and rt. axilla. There was dullness over rt. post. lung base. Subject had a rash similar to tinea versicolor over back. Impression was pneumonia and tinea. X-ray showed right lower lobe pneumonia. On 18 July the lungs were clear to P and A. X-ray on 20 July showed almost complete resolution of the pneumonic process. Lungs were clear to P and A on 22 July. Subject was discharged from hospital on 25 July.

Subject 21. Negro male, aged 17 years. Past history of pneumonia at 6 months and again at 11 years. X-ray revealed abscessed tooth. Physical exam on 20 June revealed poor oral hygiene with need of immediate dental attention, slightly hypoactive knee jerks bilaterally, and slightly hypoactive rt. ankle jerk. X-ray negative.

Pre-period: He had a toothache on first two days with an extraction on 2nd day. On 12th day he had a mild sore throat. Physical exam on 4 July revealed slightly hypoactive knee and ankle jerks bilaterally.

Experimental period: Uneventful. Physical exam on 15 July revealed bilaterally slight hypoactive knee and ankle jerks.

Recovery period: Uneventful. Physical exam on 26 July revealed bilaterally slightly hypoactive knee and ankle jerks.

Subject 22. White male, aged 18 years. Past history of occasional sinus headaches, chronic constipation, bright red blood in stools, and multiple abscesses with multiple extractions. Physical exam on 20 June revealed multiple extractions. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a mild aciniform eruption on face.

Experimental period: Subject complained of dizziness on 1st day. On 3rd day he had an anxiety reaction due to family and marital troubles. On 4th day he complained of a mild cough. Physical exam on 15 July revealed increased breath sounds, coarse rales, and few expiratory wheezes in lung bases. Lower abdomen was slightly tender.

Recovery period: Uneventful. Physical exam on 26 July revealed slightly hyperactive knee and ankle jerks.

Subject 90. Negro male, aged 17 years. Past history of gonorrhea in 1954 and 1955 treated with penicillin and no drug reaction. Has lt. parietal headaches since kick in 1954. He is cardiac-conscious but not easily fatigued. His eyes have been red since exposure in gas chamber in 1955. Had questionable papilla excised from larynx in 1950. Physical exam on 20 June revealed recent extraction of rt. upper molar. There was a moderate infection of vessels at bulbar conjunctiva. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a mild aciniform eruption on face.

Experimental period: Complained of headache on 4th day. Physical exam on 15 July revealed enlarged tonsils and a moderate epidermophytosis.

Recovery period: On 2nd to 4th day he complained of abdominal pain and chest pain. Physical exam on 26 July revealed a mild pharyngitis.

Subject 91. White male, aged 17 years. Past history of bifrontal headaches when he misses meals. Fractured rt. humerus three years ago. Physical exam on 20 June revealed a slightly hypoactive rt. knee jerk. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed slightly hypoactive knee and ankle jerks.

Experimental period: No complaints. Physical exam on 15 July revealed a slight injection of rt. ear, enlarged tonsils, and slightly hypoactive knee jerks.

Recovery period: From 2nd to 5th day he complained of headaches. Physical exam on 26 July revealed enlarged tonsils, a mild aciniform eruption on face, and slightly hypoactive knee and ankle jerks.

Subject 92. White male, aged 19 years. Past history is non-contributory. Physical exam 20 June revealed a mild aciniform eruption on face. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a mild aciniform eruption on face.

Experimental period: He complained of headache on 4th day. Physical exam on 15 July revealed redness of both eyes, mild pharyngitis, and a moderate aciniform eruption on face.

Recovery period: Subject complained of weakness on 4th day. Physical exam on 26 July revealed a moderate aciniform eruption on face.

Subject 23. White male, aged 19 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed a slight aciniform eruption on back and chest. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July essentially negative.

Experimental period: On first day he complained of thirst, headache, weakness, and fatigue. On second day he was extremely thirsty, dizzy, depressed, fatigued, and complained of stomach cramps. On 3rd day his throat was dry, tongue swollen and coated and he had slight abdominal pains. He complained of headache on 4th day, and was extremely fatigued after heat test on 5th day. On 7th day he again had upper abdominal pains similar to stomach cramps. On 9th day he was dizzy. Physical exam on 15 July revealed a coated tongue, mild post-pharyngeal hyperplasia and injection, and slight hyperplasia of papillae of tongue.

Recovery period: He complained of heartburn with nausea on first four days. On 11th day he had heartburn and a burning anus. Physical exam on 26 July revealed a slightly injected lt. tonsil.

Subject 24. Negro male, aged 18 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed a coated tongue, bilateral cervical nodes, and absent deep tendon reflexes of upper extremities. X-ray negative.

Pre-period: Subject complained of abdominal pain on 4th day. Physical exam on 4 July revealed infection of rt. tonsillar pillar and absent abdominal reflexes.

Experimental period: On first day he complained of mild stomach cramps and fatigue. On 3rd day he had a dry mouth and coated tongue, mild abdominal cramps, leg cramps, and was markedly fatigued. On 4th day he was markedly fatigued and depressed. On 5th day was very depressed, dizzy, and had a slight headache. On 6th day had a slight headache and still depressed. On 7th day he was moderately fatigued and had diarrhea. On 8th and 9th days he complained of leg cramps, was fatigued, and had coated tongue and questionable acetone odor on breath. In the p.m. he complained of severe mid-gastric and mid-sub-sternal pain, and was markedly fatigued. On 10th day he had slight stomach cramps and was weak. Physical exam on 15 July revealed a coated tongue and posterior pharyngeal hyperplasia with injection, and mid-epigastric tenderness on palpation.

Recovery period: On 1st day he had abdominal cramps, heartburn, tender cervical nodes, and was weak. On 2nd day he was weak and had blackout spells. On 3rd day he had a slight residual weakness. He was given an emergency leave on 4th day because of death of his father.

Subject 25. White male, aged 20 years. Past history non-contributory. No food or drug allergy. Physical exam on 20 June revealed dental caries, slight aciniform eruption on buttocks, and bilateral cervical lymphadenopathy. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a mild aciniform eruption on face and buttocks.

Experimental period: On 2nd day he had a slight headache, and was slightly thirsty, and mildly fatigued. He complained of stomach cramps and a headache on 3rd day and was lightheaded. On 4th day he had a headache and weak legs and was depressed. On 5th day he was markedly fatigued and weak. On 6th day he was weak and had a headache. On 7th day he had a headache, severe mid-epigastric cramps, and sub-sternal discomfort. On 8th day he was weak, and had a dry throat and severe abdominal and lower chest pain. On 9th day he had a slight headache and was weak. On 10th day he complained of weakness, heartburn, and headache. Physical exam on 15 July revealed a coated tongue and lt. post. cervical and bilateral ant. cervical lymphadenopathy.

Recovery period: For first five days he complained of heartburn and headache, with residual weakness on first three days. Physical exam on 26 July revealed folliculitis on both buttocks.

Subject 26. White male, aged 17 years. Past history of hospitalization for two weeks with gunshot wounds. No food or drug allergy. Physical exam on 20 June revealed dental caries, gunshot wound on rt. upper extremity with palpable nodules (buckshot), and bilateral inguinal nodes. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a mild aciniform eruption on face and bilateral cervical and inguinal nodes.

Experimental period: On first day he complained of pain in lt. ant. chest and dizziness. On 2nd day he had mild stomach cramps, chest pain, and was dizzy and very thirsty. On 3rd day he had a slight headache, dry skin, and epidermophytosis. On 4th day he was extremely dizzy, markedly fatigued and weak, and had stomach cramps. On 5th day he complained of marked fatigue, headache, and weakness. On 7th day he had backpain, weakness, slight headache, moderate fatigue, and acetone on breath. On 8th and 9th days he complained of heat rash and weakness. On 10th day he was weak. Physical exam on 15 July revealed a coated tongue, hyperplasia of tongue papillae, epidermophytosis, heat rash, and a small hemangioma over 5th lumbar vertebra.

Recovery period: He had residual weakness on first three days. From 4th to 8th days complained of heartburn and headache. Physical exam on 26 July essentially normal.

Subject 27. Negro male, aged 18 years. Past history of tonsillitis. No food or drug allergy. Physical exam on 20 June revealed a moderate aciniform eruption on face, dental caries, and flat feet. X-ray negative.

Pre-period: Subject complained of sore throat on first four days with coughing on first two days. Physical exam on 4 July revealed infected tonsillar pillars, slight aciniform eruption on face, and bilateral shotty inguinal and cervical nodes.

Experimental period: Subject complained of stomach cramps on first two days and had a swollen lt. tonsil and submandibular nodes. On 3rd day he complained of anuria, and stomach cramps, and had submandibular nodes. On 4th day he had leg cramps, stomach cramps, and submandibular nodes. On 7th day he complained of fatigue and sore throat. From 8th to 10th days he complained of a sore throat and had submandibular nodes. Physical exam on 15 July revealed a coated tongue, mild tonsillitis and a moderate aciniform eruption on face.

Recovery period: From 2nd to 5th day he complained of heartburn and a burning anus. On 8th day he had a headache. Physical exam on 26 July revealed a slight aciniform eruption on face.

Subject 28. White male, aged 18 years. Past history of tonsillitis at age 14 and allergy to tomatoes. Physical exam on 20 June revealed a conversion squint O.D., dental caries, and an aciniform eruption on face and back. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a slight aciniform eruption on face, chest, back, and buttocks. Tonsillar pillars were injected.

Experimental period: He complained of slight fatigue and occasional stomach cramps on the 1st day. On second day he was slightly thirsty. He had a headache on 6th day. Physical exam on 15 July revealed a mild injected throat, moderate aciniform eruption on face, scattered folliculitis over post-thoracic area, and lt. lateral recti in mid-abdomen tender to light palpation.

Recovery period: Uneventful. Physical exam on 26 July revealed a slight bilateral conjunctivitis.

Subject 29. White male, aged 18 years. Past history non-contributory. No food or drug allergy. Physical exam on 20 June revealed a slight aciniform eruption on face. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a slight aciniform eruption on face, infected tonsillar pillars, bilateral shotty inguinal nodes, and absent knee and ankle jerks.

Experimental period: Subject was fatigued and thirsty on 1st day. On 2nd day he was dizzy, and on 3rd and 7th days had a headache. On 9th and 10th days he complained of being constipated with headache on 10th day. Physical exam on 15 July revealed a coated tongue and post-pharyngeal injection.

Recovery period: Subject complained of constipation for first three days with headache on 1st and 8th days. Physical exam on 26 July revealed a coated tongue.

Subject 30. White male, aged 19 years. Past history non-contributory. No drug sensitivity, but a possible allergy to mayonnaise. Physical exam on 20 June revealed dental caries, slight aciniform eruption on buttocks, and shotty inguinal nodes bilaterally. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed an exanthglasm of right lower lid; tonsillar pillars infected; slight aciniform eruption of buttocks, rt. thigh, and both legs; and shotty rt. cervical and bilateral inguinal nodes.

Experimental period: He complained of mild fatigue and slight headache on 1st day. He had mild stomach cramps on 2nd day and was dizzy on 2nd and 3rd days. On 6th and 7th days he had a sore throat. Physical exam on 15 July revealed moderate post-pharyngeal hyperplasia and a moderately depressed sternum.

Recovery period: He complained of headache on 3rd day. Physical exam on 26 July essentially normal.

Subject 31. White male, aged 19 years. Past history of hospitalization for fractured cervical vertebra. No food or drug allergy. Physical exam on 20 June revealed dental caries, bilateral injection of tonsillar pillars, and a slight aciniform eruption on back. X-ray negative.

Pre-period: Complained of abdominal pain on 3rd day. Physical exam on 4 July revealed injected tonsillar pillars, slight aciniform eruption on back and face, and increased sensitivity to pin prick over the back. Subject complained of RUQ pain with exercise and lifting heavy weights.

Experimental period: He complained of abdominal cramps and fatigue on first day. On 2nd day he was very thirsty, moderately fatigued, and sweating profusely. On 3rd day he had severe RUQ pain, and was thirsty, fatigued, and sweating profusely. On 4th day he complained of very severe RUQ pain, and headache, and was markedly fatigued and depressed. On 5th day he was near collapse at end of heat test. He had a fever of 103.6°F and very severe RUQ pain. He was given 50 mg of Demerol and placed in a cold shower. His temperature started to fall and he was given 1000 ml 5% D/S and 500 cc 5% D/W. On following morning he was markedly exhausted and had a low grade fever and persistent RUQ pain. He was taken off experimental regimen and placed on FRA diet and status.

Recovery period: For next eight days he had RUQ pain whenever he exercised or lifted heavy weights. He had a sore throat on 5th and 6th days after being placed on FRA diet. Physical exam on 15 July revealed a slightly injected throat and slight RUQ tenderness. Physical exam on 26 July revealed coated tongue, slight aciniform eruption on back, dullness and diminished breath sounds in rt. lower lung, tender palpable mass (probably

liver) in RUQ, and diminished left knee jerk. He complained of RUQ pain with exercise and lifting weights.

Subject 32. White male, aged 18 years. Past history of a tracheotomy at 5 years for diphtheria; possible allergy to eggs. Physical exam on 20 June revealed dental caries and shotty bilateral inguinal nodes. X-ray negative.

Pre-Period: He had a heat rash on 2nd and 3rd days. On 5th day he had a black-out spell during three-hour test (blood-drawing) which lasted 4-5 minutes. He had several clonic movements of upper extremities during the spell and did not react to painful stimuli. Physical exam on 4 July revealed a severe aciniform eruption on buttocks, infected tonsillar pillars, and bilateral inguinal nodes.

Experimental period: He complained of slight headache, occasional stomach cramps, mild fatigue, and of being "short-winded" on 1st day. He had stomach cramps and was dizzy on 2nd day. On 3rd day he complained of moderate thirst and a burning stomach. On 4th day he had a sore tongue, occasional stomach cramps, postprandial burning stomach, and epidermophytosis. On 5th day he had a gritty sensation in mouth. On 7th day he had a slight burning stomach. Physical exam on 15 July revealed a post-pharyngeal hyperplasia, moderate aciniform eruption on buttocks, and tender bilateral inguinal nodes.

Recovery period: For the first three days he complained of tenderness over parotid glands bilaterally. The pain developed while he was eating. He was given a slice of lemon to suck on and experienced immediate bilateral pain over the parotid areas. This pain was shooting in nature and with no radiation. Stenson's ducts were normal in appearance and no salivary discharge was noted. The area of pain felt swollen. The pain disappeared within one minute after subject stopped sucking on lemon. Repeat test with lemon rind elicited the same signs and symptoms. These signs and symptoms gradually regressed and disappeared completely on the 4th day. The impression was dyskinesia of Stenson's duct. Physical exam on 26 July revealed a slightly injected post. pharynx and slight aciniform eruption on face.

Subject 33. White male, aged 18 years. Past history of tonsillitis at 16 years. Physical exam on 20 June revealed a hyperexotropia O.D. and a vesicular eruption of the soft palate. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a vesicular eruption of soft palate, slight aciniform eruption of face and buttocks, and injection of tonsillar pillars.

Experimental period: He was slightly nauseated on 2nd day. He had severe thirst, headache, abdominal pain, nausea, coated tongue, weakness, dizziness, and precordial pain. On 4th day he complained of dizziness, headache, weakness, and an inability to sweat. On 5th day he was moderately

fatigued, and had precordial, facial, and lt. arm paresthesias post heat test. He only completed six laps of heat test due to beginning signs of heat exhaustion. On 6th day he had a headache and vomited. On 7th day he experienced gagging and vomited on two occasions. Physical exam on 15 July revealed shotty rt. submandibular nodes.

Recovery period: From 2nd to 4th day he had a sore throat with cough on 2nd and 3rd days and toothache on 4th day. Physical on 26 July essentially normal.

Subject 34. White male, aged 17 years. Past history of severe headaches with loss of consciousness between 12 and 13 years. No food or drug allergy. Physical exam on 20 June revealed moderate aciniform eruption on face, buttocks, and back. Cervical, inguinal, and axillary nodes bilaterally enlarged. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a severe aciniform eruption on face, back, chest, and buttocks. Cervical and inguinal nodes were enlarged. Rt. knee jerk slightly hyperactive and lt. knee jerk diminished.

Experimental period: He complained of thirst, coughing, and mild stomach cramps on first day. On 2nd day he was thirsty, fatigued and dizzy. On 3rd day he had severe stomach cramps, slight headache, and was markedly fatigued. On 5th day he complained of dizziness, slight stomach cramps, and slight gagging. He was near collapse two-thirds through heat test and had chilly sensation in legs. He was removed and treated for moderate exhaustion. On 6th day he had nausea, gagging, and slight burning stomach. On 9th day he complained of slight headache and mild fatigue. Physical exam on 15 July revealed a slight aciniform eruption on back and face.

Recovery period: Uneventful. Physical exam on 26 July revealed a slight aciniform eruption on back.

Subject 35. White male, aged 17 years. Past history of tonsillitis at age 10 and a brain concussion at age 14. No food or drug allergy. Physical exam on 20 June revealed a bilateral tonsillar injection, dental caries, slight aciniform eruption on face and buttocks, absent rt. knee jerk, and poor oral hygiene. X-ray negative.

Pre-period: He had a headache on 2nd day. Physical exam on 4 July revealed a slight aciniform eruption on face and diminished sensation to pin-prick over both upper extremities and rt. scapula.

Experimental period: He complained of headache and slight fatigue on 1st day. On 3rd day he was dizzy. On 5th day he had a headache and was moderately fatigued. On 6th day he was slightly dizzy and had occasional leg cramps. On 10th day he complained of heartburn, headache, and dizziness. Physical exam on 15 July revealed a coated tongue, post-pharyngeal injection and hyperplasia, and bleeding gums.

Recovery period: He complained of heartburn and headache for first three days. Physical exam on 26 July revealed slightly injected pharynx and mild folliculitis of face.

Subject 36. White male, aged 21 years. Past history of insomnia and stuttering. No food or drug allergy. Physical exam on 20 June revealed a slight aciniform eruption on buttocks, Grade I apical systolic murmur, atrophic lt. testis, injected tonsillar pillars, and short lower lt. leg. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed diminished sensation to pin prick over lt. scapula, rt. ant. body, and lt. ant. chest. Slight aciniform eruption of buttocks, Grade I apical systolic murmur, and injected tonsillar pillars.

Experimental period: Had a stomach-ache on 1st day. On 2nd day he complained of headache, dizziness, thirst, and stomach-ache. On 3rd day he was dizzy and thirsty. On 5th day he complained of marked fatigue, slight headache, and dizziness. On 7th day he had muscle cramps and headache. Physical exam on 15 July revealed a split first apical systolic sound.

Recovery period: He complained of bleeding gums on first three days. On 4th day he dropped out of heat test after 8 laps because of dizziness. Physical exam on 26 July revealed a slight injection of lt. tonsillar pillar.

Subject 37. Negro male, aged 17 years. Past history non-contributory. No food or drug allergy. Physical exam on 20 June revealed injected rt. tonsillar pillar, dental caries and bilateral cervical, lt. axillary, and rt. inguinal nodes. Knee and ankle jerks absent. X-ray negative.

Pre-period: He had a cough on first two days and a sore throat on the 9th day. Physical exam on 4 July revealed a slight aciniform eruption on face, harsh breath sounds at both post lung bases, effusion of lt. knee, and diminished sensation to pin prick on lt. lower extremity.

Experimental period: He had a lt. suprapatellar bursitis with water. He complained of thirst on 2nd day. On 3rd day he had a headache and lt. knee pain. On 8th day he had a mild bilateral frontal headache. Physical exam on 15 July revealed a mild suprapatellar bursitis without water.

Recovery period: He had a headache on first two days. Physical exam on 26 July essentially normal.

Subject 38. White male, aged 17 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed dental caries. X-ray negative.

Pre-period: Subject complained of a headache on 5th day. From 6th

to 12th days he had a sore throat and cough. Physical exam on 4 July revealed a slight aciniform eruption on face, hyperactive rt. knee jerk, diminished lt. knee jerk, and diminished sensation to pin-prick over rt. scapula, lt. and rt. ant. chest, rt. buttocks, and abdomen.

Experimental period: He complained of slight stomach cramps on first day. On 2nd day he vomited at breakfast. On 3rd day he vomited, had a slight headache, and was very depressed. He had occasional stomach cramps on 4th day. On 6th day he had an earache. On 8th day he complained of slight fatigue, slight stomach cramp, and headache. Physical exam on 15 July revealed a coated tongue.

Recovery period: He had occasional headaches. Physical exam on 26 July essentially normal.

Subject 39. Negro male, aged 18 years. Past history is non-contributory. No food or drug allergy. Physical exam revealed a severe myopia and dextrocardia. X-ray revealed a dextrocardia with a possible situs inversus.

Pre-period: He had a sore throat on 3rd and 4th days. Physical exam on 4 July revealed a severe myopia and bilateral inguinal nodes.

Experimental period: On 2nd day he was slightly fatigued and gagging. On 3rd day he complained of a slight fatigue and headache. On 7th day he had a marked headache and sore throat. On this day, the WBC was 11,000 and the differential showed 57% polymorphonuclear leukocytes (5% stab cells), 30% lymphocytes, 3% monocytes. A urinalysis indicated negative albumin, 3+ acetone, and 0-2 RBC and 0-6 WBC per high power field. On 8th day he had a severe cough and fever. Penicillin was given. On 9th day he was still running a fever and he was taken off the experimental regimen. Physical exam on 15 July revealed a coated tongue, slightly injected post-pharynx, dextrocardia, and cervical nodes.

Recovery period: He was still running a fever and was air-evacuated to Chanute AFB on 3rd day. A physical exam there on 18 July revealed yellowish exudate on lt. tonsil; tender lt. tonsillar node; and non-tender post cervical, axillary, and inguinal nodes. Both ear drums were red. There was a Grade I basal systolic murmur. Impression was subsiding tonsillitis and bilateral otitis; rule out pneumonia and infectious mononucleosis. On 25 July subject still had a yellowish exudate on lt. tonsil and non-tender cervical, axillary, and inguinal nodes. Impression was infectious mononucleosis. Blood smear revealed atypical lymphs, and heterophil agglutination was titer 1:14. Subject was discharged after seven days of hospitalization.

Subject 40. White male, aged 19 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed injected rt. tonsillar pillars, flat feet, and absent lt. ankle jerk. X-ray

negative.

Pre-period: He had a sore throat on 4th and 5th days. From 7th to 10th days he was coughing. During this period, a white cell count was done. There were 8,700 WBC and the differential revealed 61% polymorphonuclear leukocytes, 37% lymphocytes, 1% monocytes, and 1% eosinophils. Physical exam on 4 July revealed flat feet.

Experimental period: Uneventful. Physical exam on 15 July revealed maxillary and mandibular edentulons.

Recovery period: He had a heat rash on 3rd day. Physical exam on 26 July revealed a coated tongue, mandibular edentulons, and slight aciniform eruption on buttocks.

Subject 41. White male, aged 17 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed pinguiculae O.D., lt. eardrum scarred, rt. follicular tonsillitis, dental caries, moderate aciniform eruption on face, and bilaterally hyperactive knee jerks. X-ray negative.

Pre-period: He had an earache on 3rd day and cough on 4th day. From 8th to 13th days he complained of sore throat, cough, chest pain, and large tender tonsillar nodes. On 14th day he had an earache. Physical exam on 4 July revealed bilaterally injected tonsillar pillars, slight aciniform eruption on face and chest, harsh breath sounds at base of both lungs, and bilateral inguinal nodes.

Experimental period: During the first two days he complained of an earache. On the second day (7 July) he was placed in Sick Bay. At that time he had an oral temperature of 99.7°F and a pulse rate of 72. The hematocrit was 39% and the ESR was 0.21 mm/min. The lying blood pressure was 130/6. The standing blood pressure was 114/92 and pulse rate, 120. He was given the water diuresis test; only 9.6% of the total dose was recovered in the four-hour period. On the 3rd day (8th of July) he was sent to Bartholomew County Hospital with acute mastoiditis and on 16 July he was evacuated to Chanute AFB.

Recovery period: He returned to Camp Atterbury on 5th day of recovery period (20 July). He complained of an earache on the 8th day. Physical exam on 26 July revealed a perforated rt. eardrum and a tender canal, coated tongue, moderate aciniform eruption on face, tender RUQ, bilateral cervical nodes with tenderness on rt. side, and slightly hyperactive deep tendon reflexes. He had external hemorrhoids at 3 and 9 o'clock.

Subject 42. Negro male, aged 17 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed a rt. follicular tonsillitis and dental caries. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed a mild lt.

epidermophytosis.

Experimental period: He complained of sore throat on 3rd day. On 5th and 6th days he had a sore rt. knee. On 7th day he was depressed and slightly fatigued. Physical exam on 15 July revealed injected post-pharynx and tonsillar areas.

Recovery period: On 4th day he had a headache. Physical exam on 26 July essentially negative.

Subject 43. White male, aged 20 years. Past history of appendectomy. No food or drug allergy. Physical exam on 20 June revealed rt. axillary nodes and flat feet. X-ray negative.

Pre-period: On 4th and 5th days he had a sore throat and cough. Physical exam on 4 July revealed a pleural friction rub at lt. base, shotty axillary nodes, bilateral inguinal nodes, diminished rt. knee jerk, and hyperactive lt. knee jerk.

Experimental period: On 2nd day he complained of gagging, mild thirst, and fatigue. On 7th day he had a dry throat and mouth. Physical exam on 15 July essentially negative.

Recovery period: He complained of abdominal cramps on 3rd day. Physical exam on 26 July essentially negative.

Subject 44. White male, aged 18 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed injected tonsillar pillars, dental caries, slight aciniform eruption on face and rt. buttocks, and bilateral cervical nodes. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed slight aciniform eruption on face and buttocks and absent ankle jerks.

Experimental period: He complained of severe thirst and moderate fatigue on 1st day. On 2nd day he complained of severe thirst. On 3rd day he had mild stomach cramps, burning stomach and tongue, and pain in rt. ant. chest. On 4th day he had an episode of hyperventilation syndrome from an acute marked anxiety and vomited the evening meal. On 5th day he complained of vomiting, slight headache, and moderate fatigue. On 6th day he vomited and had a slight headache. Physical exam on 15 July revealed a slight injected lt. tonsil, ant. cervical nodes, and slight aciniform eruption on face.

Recovery period: On 9th day he had an earache. Physical exam on 26 July essentially negative.

Subject 94. White male, aged 18 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed a pigeon breast. X-ray negative.

Pre-period: Had a sore throat and cough for the first twelve days. On the 8th day the WBC was 12,050 and the differential showed 65% polymorphonuclear leukocytes, 26% lymphocytes, 6% monocytes, and 4% eosinophils. Physical exam on 4 July revealed a slight aciniform eruption on face, wheezes at both lung bases, bilateral shotty inguinal nodes, rt. knee jerk diminished, lt. knee jerk hyperactive, ankle jerks diminished, and pigeon breast.

Experimental period: Uneventful. Physical exam on 15 July revealed a slight aciniform eruption on face and pigeon breast.

Recovery period: No complaints. Physical exam on 26 July revealed lt. eye tends to move out on convergence, coated tongue, and pigeon breast.

Subject 95: Negro male, aged 18 years. Past history non-contributory. No food or drug allergy. Physical exam on 20 June essentially normal. X-ray negative.

Pre-period: He had a toothache from 3rd to 8th day. Physical exam on 4 July revealed a moderate aciniform eruption on face, and bilateral shotty inguinal nodes.

Experimental period: Uneventful. Physical exam on 15 July revealed a coated tongue.

Recovery period: He complained of stomach ache on 2nd day. Physical exam on 26 July revealed a slight aciniform eruption on face, athletes foot, and hyperactive lt. knee and ankle jerks.

Subject 102. White male, aged 18 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed a spreading maculopapular rash over anus, legs, face, and back. There was some oozing and sealing.

Pre-period: Rash persisted through first four days of period with

more spreading and new crops of maculopapular vesicles. On the 4th day the WBC was 15,750 and the differential showed 65% polymorphonuclear leukocytes, 25% lymphocytes, 2% monocytes, and 8% eosinophils. The following day he was sent to Fort Benjamin Harrison for diagnosis and treatment.

Experimental period: At Fort Benjamin Harrison.

Recovery period: Returned to Camp Atterbury on the first day of the recovery period. He had a heat rash on 2nd day. Physical exam on 26 July revealed hypertrophy of gums, and moderate aciniform eruption on back and face.

Flight 3

Subject 45. White male, aged 27 years. Past history of sinusitus at age 24. Physical exam on 20 June revealed injected nasal mucosa. X-ray negative.

Pre-period: Rhinitis during first week for which he received nose drops and Benadryl. Physical exam on 4 July revealed a slight aciniform eruption on face.

Experimental period: Complained of hunger on 1st and 2nd days, with gas, anxiety, and jitters on 2nd day. He was jittery and extremities were falling asleep on 3rd day. He was slightly nauseated on 4th day. On 4th to 9th days he was weak and his extremities were falling asleep with periods of numbness and tingling. He was weak and complained of no stools. His joints became painful and he was extremely fatigued on the 9th day. Physical exam on 15 July revealed 1+ knee jerks with reinforcement and 2+ ankle jerks with reinforcement. He was weak and complained of no stools.

Recovery period: Still weak on 1st day. On 2nd day he complained of hunger. He had a feeling of abdominal fullness and frequent stools on 3rd day. He experienced a slight anorexia at evening meal on 8th day. Physical exam on 26 July revealed enlarged cervical nodes.

Subject 46. White male, aged 17 years. Past history of frequent headaches and feeling like "head will pop." Physical exam on 20 June revealed a mild aciniform eruption on shoulders, hyperactive knee and ankle jerks, left vericocoel, and enlarged tonsils. X-ray negative.

Pre-period: Uneventful except for a mild pharyngitis of four days' duration. Physical exam on 4 July revealed slight aciniform eruption on face and bilaterally equal and normal knee and ankle jerks.

Experimental period: Complained of hunger on first day. On 2nd and 3rd days he experienced decreased thirst, and weakness. He became extremely irritable and complained that extremities were "falling asleep with tingling sensations." From 4th to 9th he had no stools, thirst diminished, and he became weak, lethargic, and lightheaded. He complained of tingling, coughing, muscle cramps, and occasional fatigue and chest pain. Physical exam on 15 July revealed a heavy brown coated tongue, poor oral hygiene with acute inflammation of gum margins, and enlarged tonsils.

Recovery period: Weak and lightheaded on 1st and 2nd days. Feeling of abdominal fullness on 4th day. Headache on 8th day. Physical exam on 26 July revealed enlarged tonsils, poor oral hygiene, and a chronic bronchitis.

Subject 47. White male, aged 18. Past history non-contributory. Physical exam on 20 June revealed poor oral hygiene. X-ray negative.

Pre-period: Uneventful except for cough on 3rd day and abdominal cramps on 12th day. Physical exam on 4 July revealed enlarged cervical nodes.

Experimental period: Subject complained of hunger and gas on first and second day. From 3rd to 5th day he had headaches and was jittery and irritable. He complained of numbness and tingling from 3rd to 8th day. He was weak, lethargic, and lightheaded from 3rd day on with gas on 3rd day, abdominal cramps on 8th day, and complained of sleepiness on 8th and 9th days. Physical exam on 15 July revealed a weak and sleepy subject with poor oral hygiene, hyperemic tongue, and slight miliaria of rt. antecubital space.

Recovery period: Some residual weakness and sleepiness first two days. He had a headache on 6th day. Physical exam on 26 July revealed poor oral hygiene.

Subject 48. White male, aged 19 years. Past history of pneumonia. Otherwise non-contributory. X-ray negative. Physical exam on 20 June essentially negative.

Pre-period: Uneventful except for cough on 3rd day. Physical exam on 4 July revealed a slight aciniform eruption on face and shoulders, a mild pharyngitis, and hyperactive knee jerks.

Experimental period: Complained of hunger on first two days with lightheadedness on 2nd day. From 3rd to 7th day he was lethargic and jittery with sensations of numbness and tingling and occasional abdominal

cramps and headache. From 3rd to 9th day he complained of constipation, weakness, and lightheadedness. On 4th and 5th day he had a sore throat with coughing from 4th to 7th day. Physical exam on 15 July revealed poor oral hygiene and a slight aciniform eruption on face. He complained of no stools, weakness, and lightheadedness.

Recovery period: Lightheaded on 1st day and blackout spells on 2nd day. Physical exam on 26 July revealed a slight miliaria on buttocks and diminished knee and ankle jerks.

Subject 49. White male, aged 18 years. Past history of tonsillitis with hospitalization. Physical exam on 20 June revealed a left vericocoel and diminished knee and ankle jerks. X-ray negative.

Pre-period: Uneventful with no complaints. Physical exam on 4 July revealed a slight aciniform eruption on buttocks and diminished knee and ankle jerks.

Experimental period: He complained of hunger for first five days with abdominal cramps on 1st day. On days 3 and 4 he was thirsty. From 4th to 10th days he was weak and lightheaded, and fatigued from 5th to 9th days. He was nauseated and irritable on 8th and 9th days. Physical exam on 15 July revealed poor oral hygiene and 1+ knee and ankle jerks with reinforcement.

Recovery period: Some residual weakness 1st day. Physical exam on 26 July revealed poor oral hygiene, slight miliaria on buttocks, and 1+ knee and ankle jerks with reinforcement.

Subject 50. White male, aged 17 years. Past history revealed bouts of constipation and hospitalization for pneumonia. Physical exam on 20 June revealed fair oral hygiene and a slight aciniform eruption of groin. X-ray negative.

Pre-period: Uneventful with no complaints. Physical exam on 4 July revealed a moderate miliaria on legs and thighs.

Experimental period: Lightheaded from 5th to 9th day and weak from 6th to 9th day. Physical exam on 15 July revealed a slight miliaria of thighs, poor oral hygiene, and diminished knee and ankle jerks.

Recovery period: Uneventful. Physical exam on 26 July revealed poor oral hygiene, slight miliaria on thighs, and diminished knee and ankle jerks.

Subject 51. White male, aged 17 years. Past history of numerous hospitalizations for pneumonia. Physical exam on 20 June revealed a slight aciniform eruption on face and slight hyperactive knee jerks. X-ray negative.

Pre-period: Complained of sore feet from 4th to 14th days. Physical

exam on 4 July revealed a slight aciniform eruption on face and a slight miliaria on legs and thighs.

Experimental period: Complained of sore feet on 1st day. Abdominal cramps on 6th day. Coughing and nasal congestion on 8th and 9th days. Physical exam on 15 July revealed slight aciniform eruption on face, slight miliaria on thighs, and poor oral hygiene.

Recovery period: Uneventful. Physical exam on 26 July revealed slight miliaria on thighs, slight aciniform eruption on face, and poor oral hygiene.

Subject 52. Negro male, aged 18 years. Past history of occasional hospitalizations with asthmatic attacks. Physical exam on 20 June revealed enlarged cervical nodes. X-ray negative.

Pre-period: Mild asthmatic episodes on 2nd and 5th days accompanied by coughing. Treated with Aludrine inhaler, Benadryl, and 200,000 units of procaine-penicillin on 5th day. On 14th day he had a mild sore throat. Physical exam on 4 July revealed slight insp. and exp. wheezes throughout chest, enlarged cervical nodes, and diminished knee and ankle jerks.

Experimental period: Nasal congestion and coughing on 1st to 6th days treated with Pyribenzamine. Lightheaded on 5th day. Asthmatic episodes on 7th and 10th days with bronchitis on 9th and 10th days. Treated with epinephrine, Pyribenzamine, ephedrine, aminophyllin, Aludrine inhaler, and phenobarbital. Physical exam on 15 July revealed enlarged cervical nodes and slight generalized wheezing over chest.

Recovery period: Residual asthma and bronchitis on 1st day. Physical exam on 26 July revealed enlarged cervical glands.

Subject 53. White male, aged 19 years. Past history non-contributory. Physical exam on 22 June essentially negative. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July essentially negative.

Experimental period: Nauseated for first five days. Lightheaded on 5th and 6th days. Physical exam on 15 July revealed poor oral hygiene, hyperemia of tongue, and slight aciniform eruption of face. Knee and ankle jerks 1+ with reinforcement.

Recovery period: No complaints. Physical exam on 26 July revealed fair oral hygiene and slight aciniform eruption on face. Knee and ankle jerks 1+ with reinforcement.

Subject 54. White male, aged 18 years. Past history of hospitalization for blood poisoning. Has difficulty eating greasy foods such as pork chops, etc. Physical exam on 20 June revealed a slight seborrheic dermatitis of

face and flat feet. X-ray negative.

Pre-period: Abdominal pain on 12th day due to gaseous distention. Physical exam on 4 July revealed a slight aciniform eruption on face, mild pharyngitis, and flat feet.

Experimental period: Gagging on first day. Nausea and gagging on 2nd to 7th days with loose stools on 2nd day and abdominal pain on 6th and 7th days. Atropine was given on 7th day to check nausea and abdominal pain. On 4th to 9th days he was lethargic and had no B.M.'s. On 8th and 9th days he had a sore throat and cough which was treated with procaine penicillin 600,000 units, APC, and ETH and codeine. Subject ate less and less meat bar until the 6th day, after which time he was effectively on starvation. Physical exam on 15 July revealed a slight aciniform eruption on face, mild pharyngitis, enlarged cervical nodes, flat feet, and reduced knee and ankle jerks.

Recovery period: No B.M. for first two days, gas on 3rd day, abdominal fullness on 4th day, and headache on 6th day. Physical exam on 26 July revealed slight aciniform eruption on face, enlarged cervical nodes, flat feet, and reduced knee and ankle jerks.

Subject 55. White male, aged 17 years. Past history non-contributory. Physical exam on 20 June revealed a slight aciniform eruption on face and slightly hyperactive knee jerks. X-ray negative.

Pre-period: No complaints. Physical exam on 4 July revealed slight aciniform eruption on face and enlarged cervical nodes.

Experimental period: From 2nd to 6th day he was nauseated with some gagging on 3rd day. He was weak from 6th to 9th days with some dizziness on 7th day. Physical exam on 15 July revealed moderate aciniform eruption on face, enlarged cervical nodes, poor oral hygiene, and 1+ knee and ankle jerks with reinforcement.

Recovery period: Uneventful. Physical exam on 26 July revealed a moderate aciniform eruption on face.

Subject 56. White male, aged 19 years. Past history is non-contributory. Physical exam on 20 June revealed a slight aciniform eruption on face, enlarged cervical nodes, and slightly hyperactive knee and ankle jerks. X-ray negative.

Pre-period: Pain in left forearm on 4th day, sore throat on 7th day, and herpes simplex on 12th to 14th days. Physical exam on 4 July revealed slight aciniform eruption on face, fair oral hygiene, herpes simplex, and slightly hyperactive knee and ankle jerks.

Experimental period: Herpes simplex for first three days. On 2nd and

3rd days he was nauseated. On 6th day he developed a mild conjunctivitis in left eye. On 8th day he had chest pain in lower precordial area which started during night and was relieved by atropine. Physical exam on 15 July revealed poor oral hygiene, slight aciniform eruption on face, and enlarged cervical nodes.

Recovery period: Uneventful. Physical exam on 26 July revealed slight aciniform eruption on face, enlarged cervical glands, and enlarged tonsils.

Subject 57. Negro male, aged 19 years. Past history of surgical hospitalization for a fractured left clavicle. Physical exam revealed a marked scleral opacity O.D., enlarged cervical nodes, and absent knee and ankle jerks. X-ray negative.

Pre-period: Toothache on 14th day. Physical exam on 4 July revealed enlarged cervical glands, and absent knee and ankle jerks.

Experimental period: Subject complained of nausea for first eight days. He gagged on first day and was hungry from 2nd to 10th days. He had abdominal cramps on 4th to 7th days which were intensified by the heat test on 6th day. Atropine was given on 6th to 7th days with relief of cramps. He had a cough on 5th and 6th days which was relieved by ETH and codeine. Physical exam on 15 July revealed slight miliaria on upper arms, enlarged cervical nodes, mild pharyngeal injection, and absent knee and ankle jerks.

Recovery period: Epigastric fullness and burning on 9th day. Physical exam on 26 July revealed enlarged cervical nodes and absent knee and ankle jerks.

Subject 58. White male, aged 18 years. Past history is non-contributory. Physical exam on 20 June revealed a slight aciniform eruption on face and hyperactive knee and ankle jerks. X-ray negative.

Pre-period: Insect bites treated with Pyribenzamine on 4th day. From 7th to 11th days he had pharyngitis for which he was given ASA every 4 hr, and procaine penicillin 600,000 units initially and 300,000 units four times a day. On 11th day he was given 600,000 units. On 12th day, X-ray revealed right lower lobe pneumonia. He was given aureomycin, 0.5 gm every 6 hr for four doses and then 0.25 gm every 6 hr, and ASA and ETH every 4 hr. He was placed on a light diet with forced fluids and did not participate in experimental period. On 17th day X-ray revealed some early clearing. On 18th day he was asymptomatic with exception of a moderate cough. On 21st day X-ray cleared and he was completely asymptomatic. He was released from the hospital on 22nd day. Physical exam on 15 July revealed slight aciniform eruption on face, fair oral hygiene, healing herpes simplex on lips, occasional subcrepitant rales in right lower lobe, and slightly hyperactive knee and ankle jerks.

Recovery period: Uneventful. Physical exam on 26 July revealed enlarged cervical nodes.

Subject 59. Negro male, aged 20 years. Past history is non-contributory. Physical exam on 20 June revealed poor oral hygiene and hyperpigmentation and thickening of skin on knees. X-ray negative.

Pre-period: Complained of headache on 2nd day. On the 3rd day he was diagnosed as having pneumonia. On this day the WBC was 14,150 and the differential showed 83% polymorphonuclear leukocytes (13% stab cells), 11% lymphocytes, 5% monocytes, and 1% eosinophils. The urine analysis was negative. He was sent to the regional hospital at Fort Benjamin Harrison where he stayed until the 13th day. On 14th day he complained of a little coughing.

Experimental period: For first four days he had a cough for which he was given Benadryl cough syrup. He also had leg cramps the first four days and complained of hunger on 4th day. He developed leg pains during the heat test which subsided in a short time. Physical exam on 15 July revealed enlarged cervical nodes, occasional subcrepitant rales in left lower lobe, poor oral hygiene, increased pigmentation of knees, and diminished knee and ankle jerks.

Recovery period: Uneventful. Physical exam on 26 July revealed enlarged cervical nodes, increased pigmentation of knees, and normal knee and ankle jerks with reinforcement.

Subject 60. White male, aged 21 years. Past history is non-contributory. Physical exam on 20 June revealed a grade I pulmonary systolic murmur and hypoactive knee and ankle jerks. X-ray negative.

Pre-period: Cough on 3rd day and pharyngitis on 4th to 6th days for which he was given 600,000 units procaine penicillin 3 x day and ASA on 4th day. On 5th day he was given Amphogel placebo with no effect. On 6th procaine penicillin again given. Physical exam on 4 July revealed fair oral hygiene, grade I pulmonary systolic murmur, and hypoactive knee and ankle jerks.

Experimental period: On 1st day he complained of stomach cramps. He had sore bleeding gums on 2nd day. On 4th day he was hungry and had LUQ pain in p.m. This pain elicited by pressure and deep inspiration. Tympanic percussion noted in LUQ with hyperactive bowel sounds. On 6th day he had a cough for which Elixer of Benadryl was given. On 7th day he was weak and complained of slight anorexia. On 8th to 10th days he complained of sore gums. Physical exam on 15 July revealed grade I pulmonary systolic murmur, poor oral hygiene, and a mild pharyngitis.

Recovery period: Complained of headache on 2nd day and on 6th to 8th days. Physical exam on 26 July revealed fair oral hygiene and a grade I pulmonary systolic murmur.

Subject 61. Negro male, aged 18 years. Past history of a fractured rt. scapula treated on O.P. status. Physical exam on 20 June revealed mucopurulent nasal discharge, follicular hyperkeratosis of face, hypoactive

ankle jerks, and normal knee jerks. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed thickening and hyperpigmentation of both knees. Knee and ankle jerks were 1+ with reinforcement.

Experimental period: On 2nd to 6th days he complained of hunger. On 4th and 5th days he was dizzy with a cough on 4th day and abdominal pain on 5th day. Physical exam on 15 July revealed hyperkeratosis on face, poor oral hygiene, and 1+ knee and ankle jerks with reinforcement.

Recovery period: On 3rd and 4th days subject complained of excessive gas and flatus. Physical exam on 26 July revealed fair oral hygiene and absent ankle and knee jerks.

Subject 62. White male, aged 19 years. Past history of hospitalization for laceration of lt. leg. Physical exam on 20 June revealed injected nasal mucosa, poor oral hygiene, lt. varicocoele, and hyperactive knee and ankle jerks. X-ray negative.

Pre-period: Nasal congestion the first three days was treated with Neosynephrin. Physical exam on 4 July revealed a slight aciniform eruption on face, nasal mucosa injected, poor oral hygiene, miliaria on buttocks, maculopapular eruption on dorsum of feet and ankles, and slightly hyperactive ankle and knee jerks.

Experimental period: Complaints of hunger on 3rd to 5th day. Physical exam on 15 July revealed a slight aciniform eruption on face, poor oral hygiene, miliaria on ankles, mild pharyngitis, left varicocoele, and slightly hyperactive knee and ankle jerks.

Recovery period: On 5th day following the water diuresis test, the subject experienced nausea and dizziness followed by an episode of unconsciousness lasting about 30 sec. This was followed by headache and nausea with one emesis of yellow watery fluid. Nausea disappeared within five minutes and headache within 15 minutes. Temperature was 102°F and pulse 86. Skin was thickened, hot, and dry. Occasional harsh breath sounds were heard over entire chest. Knee and ankle jerks were slightly hyperactive and cervical nodes were enlarged. He was placed in Sick Bay until 8th day. Fluids were forced, NaCl 3 x day, aureomycin, 0.50 gm every 6 hr. for four doses and then 0.25 gm every 6 hr., ETH with codeine, and ASA every four hr. On 6th day temperature remained between 100.4° and 102.0°F and pulse at 80. Skin was moist and cool. Subject had a slight cough. On 7th day subject had a slight cough, chest was clear, and he remained afebrile for 18 hrs. The treatment was continued. On 8th day he was afebrile, had no complaints, and was dismissed from Sick Bay. Physical exam on 26 July revealed a slight aciniform eruption on face, poor oral hygiene, left varicocoele, and slightly hyperactive knee and ankle jerks.

Subject 63. White male, aged 17 years. Past history is non-contrib-

utory. Physical exam on 20 June revealed poor oral hygiene, fine musical rales left lower lung, and slightly hyperactive knee and ankle jerks. X-ray negative.

Pre-period: On 5th day patient complained of a maculapapular rash on rt. hip and rt. popliteal space and was treated with calamine and Pyribenzamine. Physical exam on 4 July revealed a papular eruption on groin and buttocks and poor oral hygiene.

Experimental period: Subject complained of thirst on 2nd and 4th days. On 4th to 8th days he complained of hunger. Physical exam on 15 July revealed a brown coated tongue and poor oral hygiene.

Recovery period: Uneventful. Physical exam on 26 July revealed poor oral hygiene, slight aciniform eruption, and normal knee and ankle jerks with reinforcement.

Subject 64. Negro male, aged 19 years. Past history of feeling cold, stuffiness, and sneezing the past few years regardless of location. Asthma precipitated by an infectious episode eight months ago. Physical exam revealed a slight aciniform eruption on face and shoulders and a grade I pulmonary systolic murmur. He complained of constipation the past few days. X-ray negative.

Pre-period: Rash in groin on 5th day. Physical exam on 4 July revealed a slight aciniform eruption on face and shoulders, grade I pulmonic systolic murmur, and enlarged cervical glands.

Experimental period: Complained of weakness in legs on 1st day and hunger and abdominal cramps on 3rd day. Physical exam on 15 July revealed a slight aciniform eruption on face and shoulders, grade I pulmonary systolic murmur, enlarged cervical nodes, and slightly hyperactive knee and ankle jerks.

Recovery period: Complained of headache on 1st to 3rd and 6th days. Feeling of burning fullness in epigastrium on 8th and 9th days. Physical exam on 26 July revealed a slight miliaria on chest, grade I pulmonary systolic murmur, and diminished knee and ankle jerks.

Subject 65. White male, aged 19 years. Past history of surgical hospitalizations for lt. and rt. arm fractures. Physical exam on 20 June revealed poor oral hygiene and enlarged cervical nodes. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed poor oral hygiene, enlarged cervical nodes, miliaria on buttocks, and slightly hypoactive knee and ankle jerks.

Experimental period: Hungry throughout period. Physical exam on 15 July revealed poor oral hygiene, enlarged cervical nodes, mild pharyngitis,

and slightly hypoactive knee and ankle jerks.

Recovery period: Uneventful. Physical exam on 26 July revealed enlarged cervical glands, poor oral hygiene, and slight miliaria on buttocks.

Subject 66. White male, aged 17 years. Past history is non-contributory. Physical exam on 20 June revealed enlarged cervical nodes, slight aciniform eruption on face and shoulders, normal knee jerks, and diminished ankle jerks. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed slight aciniform eruption on face, miliaria on buttocks, and diminished knee and ankle jerks.

Experimental period: Uneventful. Physical exam on 15 July revealed a slight miliaria on buttocks, mild pharyngitis, and 1+ knee and ankle jerks with reinforcement.

Recovery period: No complaints. Physical exam on 26 July revealed slight miliaria on chest and buttocks, fair oral hygiene, and diminished knee and ankle jerks.

Subject 96. Negro male, aged 17 years. Past history is non-contributory. Physical exam on 20 June is essentially negative. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed enlarged cervical glands and pigmentation and thickening of skin on knees.

Experimental period: Complained of constipation and burning on urination in A.M. and post heat test on 7th day. Admits to past history of gonorrhea. Examination revealed no discharge but slightly enlarged prostate, and hard feces in rectum which were treated with Milk of Magnesia. Physical exam on 15 July revealed enlarged cervical nodes and mild pharyngitis.

Recovery period: Conjunctivitis lt. eye. Physical exam on 26 July revealed enlarged cervical nodes and a bilateral, mild conjunctivitis.

Subject 97. White male, aged 19 years. Past history of tonsillectomy. Physical exam on 20 June revealed poor oral hygiene, slight aciniform eruption on shoulders, and bilateral hammertoe. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed poor oral hygiene, miliaria on thighs and buttocks, and bilateral hammertoe.

Experimental period: Complained of all day headache, and slight cough and nausea in evening of 3rd day. Pharynx and nasal mucosa injected, and occasional non-localized wheezes in chest. Given 600,000 units procaine penicillin, ASA every six hr, ETH with codeine every 3-4 hr, and NaCl. Cough increased on 4th day; he was given 600,000 units procaine penicillin.

Cough diminished on 5th day. Given 600,000 units procaine penicillin on 6th day. Physical exam on 15 July revealed a mild bronchitis, slight miliaria on thighs and buttocks, and bilateral hammertoe.

Recovery period: Uneventful. Physical exam on 26 July revealed poor oral hygiene, miliaria on thighs and buttocks, enlarged cervical nodes, bilateral hammertoe, and diminished knee and ankle jerks.

Subject 98. White male, aged 21 years. Past history of chronic nasal discharge and appendectomy. Physical exam on 20 June revealed injected and edematous nasal mucosa and poor oral hygiene. Two weeks previously hurt neck and back while diving. Left trapezius and lt. rhomboides tender; decreased rotation of head. Ankle jerks diminished and knee jerks are normal. X-ray negative.

Pre-period: Tender lt. trapezius and interscapular area. Physical exam on 4 July revealed poor oral hygiene, injected nasal mucosa, very slight tenderness of lt. interscapular muscles, and diminished knee and ankle jerks.

Experimental period: Headache on 6th day post heat test. Physical exam on 15 July revealed a chronic bronchitis, poor oral hygiene, and 3+ knee and ankle jerks with reinforcement.

Recovery period: Slight sore throat and lt. earache on 10th day. Physical exam on 26 July revealed chronic bronchitis with mild naso-pharyngitis, enlarged cervical nodes, and diminished knee and ankle jerks.

Flight 4

Subject 67. White male, aged 20 years. Past history of frequent headaches; wears glasses. Surgical hospitalization at age 14 for broken left arm at which time he developed hives. Physical exam on 20 June revealed coated tongue, dental caries, recession of gums, shotty lt. inguinal nodes, and atrophy of left leg muscles with shortening of leg. X-ray negative.

Pre-period: Cold on first day. Sore throat on 4th and 9th days. Complained of being dizzy post heat test on 12th day. Physical exam on 4 July revealed rt. knee jerk hypoactive with reinforcement, left knee jerk normal, and ankle jerks absent bilaterally with reinforcement.

Experimental period: On 4th day subject lost consciousness and fell on floor. He responded well to Trendelenburg; blood pressure, 108/76, oral temperature, 98.6°F and pulse, 66; mucous rales were heard at rt. base, which cleared after coughing; Rt. pupil larger than lt. On 5th day subject had hiccoughs for 15 min in morning and rt. pupil was larger than lt. in evening. On 6th day he had abdominal pains. He complained of weakness and dizziness on awakening, and sore left knee on 7th day. Sore left knee and abdominal pain on 8th day. Abdominal pain and weakness on 9th day and weakness on 10th day. Physical exam on 15 July revealed rt. pupil larger than

left, injected sclera, tongue smooth, acetone breath, generalized mild abdominal tenderness, shotty rt. axillary nodes, shotty bilateral inguinal nodes, knee and ankle jerks absent, rt. triceps reflex absent, rt. biceps reflex diminished, and anesthesia of posterior aspects of both legs and lt. anterior thigh.

Recovery period: Residual weakness the first day. Physical exam on 26 July revealed pinguiculae O.D., nasal septum deflected to rt. with 25% obstruction, shotty rt. axillary nodes, and bilaterally absent knee, ankle, biceps, and triceps reflexes.

Subject 68. Negro male, aged 19 years. Has midfrontal headaches twice a week associated with light headedness but no fainting or loss of consciousness. Leafy green vegetables cause nausea. No food or drug allergy. Physical exam on 20 June revealed hypertrophic gums. X-ray negative.

Pre-period: On 4th day subject complained of a sore throat. On 5th and 6th days he had a slight head cold and was drowsy on 6th day. Headache on 11th day. Physical exam on 4 July revealed a slight follicular hyperkeratosis of knees and a split M_1.

Experimental period: On 4th day he complained of abdominal pain, cold feelings, was depressed, and fears impending death. On 5th day he had abdominal cramps, felt drowsy, stopped sweating, still depressed, and feared impending death. On 7th day he complained of weakness, abdominal pain, insomnia, and leg pains. Examination revealed lethargy, hyporeflexia, and dry skin. He was pulled off experimental regimen and given glucose. Placed on D-1 recovery diet on 8th day. On 9th day on D-2 recovery diet and complained of hunger. Physical exam on 15 July revealed bilateral inguinal nodes, and absent rt. triceps, rt. radial, knee, and ankle reflexes.

Recovery period: Complained of headache on 7th day which was exaggerated by forward motion of head. He complained of anorexia for past 16 hours. Oral temperature, 100.7°F. He had a slight oropharyngeal injection but heart and lungs were negative. Treated with penicillin 600,000 units stat, 600,000 units daily, forced fluids. On 8th day he complained of severe frontal headache. There was a mild oropharyngeal injection and a temperature of 104°F. The WBC was 9,250 and the differential showed 55% polymorphonuclear leukocytes (4% stab cells), 43% lymphocytes, 1% monocytes, and 1% eosinophils. He was given 600,000 units of penicillin and forced fluids. In the evening he was air-evacuated to Chanute AFB. Physical exam on 23 July revealed harsh breath sounds over left lower lung fields posteriorly and no rales. Impression was pneumonitis left lower lobe. X-ray showed bronchopneumonia of left lower lobe. On 26 July physical exam was negative. X-ray was negative on 1 August and subject was discharged from hospital.

Subject 69. White male, aged 18 years. Past history of occasional episodes of lightheadedness. Whip cream gags him. Treated with penicillin in 1953 for gonorrhea; no reaction. Physical exam on 20 June revealed squint O.S. with diplopia, injected tonsillar pillars, aciniform eruption on

face, and grade II flat feet. X-ray negative.

Pre-period: Complained of headache on 1st day. U.R.I. in morning of 2nd day. Physical exam on 4 July revealed a slight aciniform eruption on face and shoulders and flat feet.

Experimental period: Complained of abdominal pain on 7th day. On 8th day became dizzy in evening with a slight vertigo. Complained of weakness on 9th day. Physical exam on 15 July revealed divergent squint O.D., smooth tongue, acetone breath, mild pharyngitis, slight aciniform eruption on face, bilaterally absent knee jerks, lt. ankle jerk absent, and rt. triceps and radial reflexes absent, and flat feet.

Recovery period: Complained of acne on face with itching on 10th day. Physical exam on 26 July revealed a mild pharyngitis, slight aciniform eruption on face, bilateral inguinal and axillary adenopathy, knee jerks both absent, and absent left triceps reflex; flat feet.

Subject 70. White male, aged 17 years. Hospitalized at age 13 for injury to left knee. Penicillin and sulfa given three months ago for pharyngitis with no reaction. No food allergy. Dislikes fat. Physical exam on 20 June revealed a coated tongue, slight hypertrophy of gums, moderate injection of tonsillar pillars, shotty left inguinal nodes, and chronic bilateral epidermophytosis. X-ray negative.

Pre-period: Complained of headache on 1st day and abdominal pain on 2nd day. On 6th day had a headache. Physical exam on 4 July revealed a coated tongue, tonsils moderately enlarged, and shotty nodes in right inguinal area.

Experimental period: Complained of vertigo when standing on 2nd day. He had chest pain, dry heaves, headache, hiccoughs, and was dizzy and drowsy on 4th day. On this day the WBC was 9,750 and the differential showed 52% polymorphonuclear leukocytes (5% stab cells), 39% lymphocytes, 7% monocytes, and 2% eosinophils. The ESR was 0.88 mm/min and the hematocrit was 55.2%. On the 5th day he complained of hiccoughs and constipation. Abdominal pain on 6th and 7th days with weakness on 7th day; skin dry and face was slightly flushed. He was taken off diet and given glucose in water.

Recovery period: Started on 12 July instead of 16 July. On D-1 rehabilitation for first two days. Complained of hunger on 2nd day. To be on D-2 for two days, then D-3 for two days, and then Field Ration A. Physical exam on 15 July revealed a rough coated tongue, bilateral shotty inguinal nodes, anesthesia of ant. aspect rt. leg, and bilaterally absent triceps reflexes. Physical exam on 26 July revealed pinguiculae O.D., coated tongue, and bilateral cervical, axillary, and inguinal nodes.

Subject 71. White male, aged 19 years. Past history of lightheadedness in summer with physical exertion, but no loss of consciousness. No history of food or drug allergy. Subject was highly nervous prior to physical

exam on 20 June which revealed a high B.P. (170/90 sitting) and a split M_1. X-ray negative.

Pre-period: Swollen rt. index finger on 1st day. He had a chest cold with a productive cough on 3rd day. From 6th to 9th days he had a head cold and stuffy nose which was treated with neosynephrine. Physical exam on 4 July revealed a moderate coating of tongue.

Experimental period: Complained of toothache on 3rd day. Physical exam on 15 July revealed an injected rt. eardrum, rt. axillary nodes, diminished knee jerks with reinforcement, and bilaterally absent triceps reflexes.

Recovery period: Uneventful. Physical exam on 26 July revealed an aciniform eruption of buttocks and post aspects of both legs, flare of costal cartilage, protuberant abdomen, diminished knee and ankle jerks, and absent rt. triceps reflex.

Subject 72. White male, aged 20 years. Past history of T and A at 14 yrs., weather sensitive rt. shoulder due to a previous accident, no drug or food allergy, chronic acne over entire body, and cramps in legs on walking. Physical exam on 20 June revealed a mild hypertrophy of gums, moderate generalized aciniform eruption, absent abdominal reflexes, and shotty rt. inguinal nodes. X-ray negative.

Pre-period: Uneventful. Physical exam of 4 July revealed a moderate generalized aciniform eruption, moderate enlargement of thyroid, enlarged node in rt. axilla, bilaterally shotty inguinal nodes, and absent abdominal reflexes.

Experimental period: Headache on first two days since exposure to DDT flyspray. On 7th day he had shaking chills, profuse sweating, and sore throat. On 8th day complained of abdominal cramps and loose stools, and had dermographia. Dermographia persisted through the 10th day. Physical exam on 15 July revealed a smooth red tongue, generalized aciniform eruption, bilateral shotty inguinal nodes, absent rt. knee jerk with reinforcement, dermographic wheals of rt. buttock, rt. flank, rt. ant. thigh, and RUQ of abdominal skin.

Recovery period: Uneventful. Physical exam on 26 July revealed pinguicule O.D., tongue smooth and red, generalized aciniform eruption, bilateral shotty inguinal nodes, and absent left triceps reflex.

Subject 73. White male, aged 21 years. Past history of chronic draining rt. ear with perforation of drum. No draining for past year. Has been constipated once a month. Was given penicillin two years ago for a virus infection. No food or drug allergy. For the past two years has had episodes of epigastric discomfort with burning, gnawing sensations and some emesis and hematemesis. These episodes last from 2-7 weeks and occur every 1-2 months. Discomfort is postprandial and also during abstinence. Physical exam on 20

June revealed a coated tongue, perforated rt. ear drum with no inflammation or discharge, and slightly hyperactive knee jerks bilaterally. X-ray negative.

Pre-period: Abdominal pains for first seven days treated with $Al(OH)_3$ tablets. Stuffy nose on 8th and 9th days treated with neosynephrine. Complained of sore gums on 10th and 11th days. Physical exam on 4 July elicited complaint of earache and revealed a watery discharge with bubbles present from eardrum. Tongue was coated, retracted gum around cavity in upper rt. second molar, slight aciniform eruption on back, and bilaterally hyperactive cremasteric reflexes.

Experimental period: From 3rd to 8th days had an otitis media which was treated with penicillin 600,000 units stat and 300,000 units per day and Auralogan drops. On the 5th day the WBC was 8,000 and the differential showed 65% polymorphonuclear leukocytes (3% stab cells), 29% lymphocytes, and 6% monocytes. On the 7th day had abdominal burning and loose stools. On 9th day he complained of eye pain, headache, loose stools, and abdominal pain. Physical exam on 15 July elicited complaints of coughing and revealed a mild pharyngitis and insp. wheezes at rt. apex. There were bilaterally enlarged axillary nodes and the rt. triceps reflex was absent. He was placed in Sick Bay.

Recovery period: On first day he complained of loose stools, coughing, and chest pain. Examination revealed increased insp. and exp. wheezes. He was given ephedrine. On the second day the wheezes were increased and heard throughout both lungs but most marked at apex. He was given ephedrine, Benadryl, steam inhalation, and placed on bed rest. He was air-evacuated to Chanute AFB in the evening. Physical exam on 18 July revealed a chronic inflamed rt. ear drum, inspiratory and expiratory wheezes over both post lower lung fields, enlarged tender liver down 2 - 3 cm below RCM, and generalized adenopathy. Impression was bronchitis and infectious mononucleosis. The heterophil agglutination titer was zero. X-ray of chest was negative. Physical exam on 22 July revealed few scattered wheezes over lung fields and a hepatosplenomegaly. Liver function tests were negative. Physical exam on 27 July revealed generalized non-tender adenopathy and liver palpable 2 - 3 cm below RCM. He was discharged from hospital on 28 July and was to be followed in Medical Clinic.

Subject 74. White male, aged 18 years. Past history of severe myopia O.S. He gained 22 pounds in basic training. Physical exam on 20 June revealed a mild bilateral ptosis of lids with myopia, bilateral depigmentation around pupils, rhinitis, mild pyorrhea, tooth markings on rt. tongue margin, severe caries, aciniform eruption of face, and bilaterally hyperactive knee and ankle jerks. X-ray negative.

Pre-period: Complained of headache from 2nd to 13th day and treated with ASA throughout. Nose cold on 3rd and 4th day treated with neosynephrine. Complained of backache on 6th, 7th, 9th, 11th, and 13th days. Had chest pain on 7th day. Had insomnia, anorexia, and nausea on 8th day. Codeine

given for headaches with no relief. Complained of anorexia on 11th and 12th days. Physical exam on 4 July revealed nasal congestion but no inflammation, tenderness in sacroiliac region, and hyperesthesia to pin-prick in sacroiliac area.

Experimental period: Complained of headache on 3rd - 5th days. Felt weak, had low back pain, and skin was dry on 3rd day. He was dizzy, did not sweat, and had an upset stomach. Because of total anhidrosis he was admitted to Sick Bay. He was given a special three-hour test. His oral temperature was 100°F, respiratory rate, 19, lying blood pressure and pulse rate, 135/82, and 88, respectively; and standing blood pressure and pulse rate 134/90 and 128, respectively. He was given the water diuresis test; there was 0.07 recovery of the water load. He began drinking at 1717 hours and began to sweat profusely at 1725 hours. Urine collected during the three-hour test was negative for acetone, albumin, and glucose; there was 3+ urobilinogen. He was transferred to Flight III. On 5th day he complained of backache and thirst. On 8th day he had a sore right leg. Physical exam on 15 July revealed a mild pharyngitis.

Recovery period: On 5th and 6th day he complained of a burning anus (has external hemorrhoids). Physical exam on 26 July revealed tender left axillary nodes and bee-sting on left hand.

Subject 75. White male, aged 17 years. Past history of penicillin for cold with no reaction. No food allergy. Gained 14 lbs. in basic training. Physical exam on 20 June revealed a coated tongue, bleeding gums with slight trauma, dental caries, pyorrhea, slight aciniform eruption on shoulders, acute epidermophytosis, hypoactive lt. knee jerk, and bilaterally absent ankle jerks. X-ray negative.

Pre-period: Runny nose on 4th day. Rash between legs on 10th day. Complained of sore and tender lt. trapezius on 11th day. Toothache on 13th day. Physical exam on 4 July revealed a coated tongue, slight aciniform eruption on face and buttocks, mild tenderness in left trapezius muscle, and knee jerks bilaterally hypoactive with reinforcement.

Experimental period: On the second day the ESR was 0.31mm/min and the hematocrit was 43.0%. Complained of toothache on 3rd day. Had slight vertigo on rapid rising during 4th day. He complained of anorexia, nausea, and abdominal pain on 5th day. Physical exam on 15 July revealed a coated tongue, slight aciniform eruption of face, knee and ankle jerks absent, lt. triceps reflex absent.

Recovery period: Complained of heartburn on 4th day. Traumatic myositis of lt. lumbosacral region on 8th and 9th days. Physical exam on 26 July revealed bilaterally reduced knee jerks.

Subject 76. White male, aged 18 years. Past history of insomnia, nightmares, and excessive worry, all of which have disappeared. When exposed to sun, rapid motion of head causes dizziness of short duration. T & A in 1950. No food or drug allergy. Physical exam on 20 June revealed slight pinguiculae

O.S., dental caries, moderate thyroid enlargement, and lt. knee jerk moderately hyperactive. X-ray negative.

Pre-period: Complained of headache and nausea on 4th day, headache on 6th day, and constipation on 10th day. On the 12th day the WBC showed 8,500 and the differential revealed 52% polymorphonuclear leukocytes (1% stab cells), 43% lymphocytes, 1% basophils, and 1% eosinophils. On 13th day had transient dizzy spells of five minutes duration after getting up in morning. Physical exam on 4 July revealed injected tonsillar pillars, slight aciniform eruption on face and shoulders, moderate thyroid enlargement, shotty rt. inguinal nodes, and flat feet.

Experimental period: On the second day the ESR was 0.57mm/min and the hematocrit was 47.5%. Complained of chest pain on 3rd day and had cervical and axillary adenopathy, total anhidrosis, and pharyngitis. Because of these complaints he was admitted to Sick Bay and was given a three-hour test and a water diuresis test. The oral temperature was 100°F, respiratory rate was 15, lying blood pressure and pulse rate, 130/90 and 112, respectively; and the standing blood pressure and pulse rate, 120/80 and 140 respectively. The subject excreted only 2.1% of the water dose in four hours. He began to drink at 1743 hours and one minute later began to sweat profusely. The urine collected during the three-hour test contained 4+ acetone and 0 urobilinogen, albumin, and glucose. On the 5th day the WBC was 8,100 and the blood smear revealed 57% polymorphonuclear leukocytes (7% stab cells), 34% lymphocytes, (7% "atypical"), 4% monocytes, 2% eosinophils, 3% basophils. The heteorophile reaction was negative. Bilateral cervical and axillary lymphadenopathy persisted until 10th day. On 9th day felt weak. Physical exam on 15 July revealed slight aciniform eruption on face and back.

Recovery period: Headache on 9th day. Physical exam on 26 July revealed bilaterally enlarged cervical and axillary nodes.

Subject 77. Negro male, aged 17 years. Past history of a questionable episode of rheumatic fever for which he received penicillin with no reaction. No food allergy. Physical exam on 20 June revealed a moderate hypertrophy of lt. tonsil, hypertrophy of gums, swelling of interdental papillae, moderate follicular hyperkeratosis on both knees, moderate dermatitis along area of clavicle, atrophy of lt. testicle, bilateral athletes foot, grade II flat feet, inactive left cremasteric reflex, and ankle jerks bilaterally hypoactive with reinforcement. X-ray negative.

Pre-period: Nasal congestion on 3rd day. On 4th day he complained of a sore throat. Tonsils and pharynx were injected and rt. cervical nodes enlarged and tender. On 11th day he complained of sore throat and P.E. revealed injected pharynx and cervical lymphadenopathy. Physical exam on 4 July revealed a 3 x 3 mm area on tongue from which papillae were absent, injection of rt. tonsil, lt. tonsil enlarged, slight follicular hyperkeratosis of elbows and knees, fungus dermatitis across clavicles, large bilateral cervical nodes, shotty rt. inguinal nodes, thyroid slightly enlarged, and absent left cremasteric reflex.

Experimental period: On second day, 7 July, subject complained of anorexia. He ate only 1/2 his ration at night meal and then vomited it. He complained of severe thirst, bitemporal headache, and stiffness of rt. leg. He was weak and lethargic and had difficulty in answering. Skin was warm and dry except for minimal sweating of face and axillae. Rt. ear drum was slightly injected, tonsillar tissue injected, rt. mastoid tender, and was restless and hyporeflexia. He had a 4+ acetonuria and TPR, after physical exam, was 104.6°F p.o., 126, and 27. At 2150 hours his rectal temperature was 105.8°F and he was given 1250 ml of water. From 2150 - 2400 hours he was sponged with alchol, draped in chilled sheets, and drafted with fans. From 2210 to 2330 hours rectal temperature stabilized between 105.1° and 104.9°F. At 2230 hours he was given 350 ml H_2O p.o. and at 2320 hrs. given 107 gm sucrose in 200 ml of water. From 2335 to 2400 hours rectal temperature rose steadily to 105.5°F at which time he was placed in "walk-in" refrigerator. On 8 July at 0015 hours rectal temperature was 105.1°, pulse, 150, resp., 42, and B.P., 80/60. At 0050 hours 5% dextrose in saline was started intravenously; B.P. was 90/60. Subject had continuous shaking chills while in refrigerator. At 0145 hours rectal temperature was 104.0°F. At 0200 hours he was removed from refrigerator and at 0210 hours given 300 ml of water orally and 600,000 units penicillin. At 0215 hours rectal temperature was 103.0°, pulse, 94, resp., 38, and B.P., 80/65. At 0335 hours the rectal temp. was 102.8°, pulse, 148, resp., 54, and B.P., 80/45. Generalized petechial rash appeared at 0340 hours. At 0435 hours temp. 104.5, pulse, 140, resp. 56, B.P. 70/45 and 300 ml of water was given orally. At 0520 hours the rectal temp. was 102.0°, pulse, 156, resp., 48, and B.P., 75/45. From 0630 - 0830 shock B.P. 0/0, no pulse, skin cold, rectal temp. 104°. Muscles were tender, there was areflexia, belly tenderness, and ileus. Subject given 5% dextrose in H_2O IV with 40 mEq KCl added. Given 1 ml of 1:2600 adrenaline subcutaneously. At 0915 and 0920 hours given 50 mg ephedrine IV. He was transferred to Bartholomew County Hospital at about 1000 hours where he expired shortly. Autopsy revealed massive adrenal hemorrhages and massive petechial hemorrhages of skin and viscera. Clinical diagnosis: Meningococcemia (Waterhouse-Friederichsen Syndrome).

Subject 78. White male, aged 20 years. Past history of hay fever, and occasional premature heart beats. EKG 1955 normal. No food or drug allergy. Physical exam on 20 June revealed inguinal canal on right slightly dilated, moderately enlarged thyroid, and triceps reflexes inactive. X-ray negative.

Pre-period: On second day complained of sore throat. On 4th to 7th days furuncle on right cheek. Physical exam on 4 July revealed moderate aciniform eruption on face, area of depigmentation on RUQ 1/2 x 1", healing furuncle on right cheek, moderately enlarged thyroid, and shotty left inguinal nodes.

Experimental period: On 5th day subject fainted; there was hypohidrosis, stentorous breathing, and numerous ventricular premature contractions every 10 beats. Physical exam on 15 July revealed slight aciniform eruption of face, left triceps and left ankle jerks absent, and diminished sensation to pin-prick on right anterior chest, and left anterior leg.

Recovery period: Uneventful. Physical exam 26 July revealed, bilateral pinguiculae, right otitis externa, moderate aciniform eruption on face, poor oral hygiene, and bilaterally absent triceps reflexes.

Subject 79. White male, aged 17 years. Past history strabismus O.S., penicillin four years ago for cold. No food or drug allergy. Physical exam on 20 June revealed slight inflammation of dental margin, hypertrophy of gums, moderate aciniform eruption of face and shoulders, split M_1, bilateral epidermophytosis, and knee jerks bilaterally hyperactive; flat feet, grade III. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed bilateral injection of tonsils and pharynx, slight aciniform eruption of face and back, split M_1, flat feet, and knee jerks bilaterally hyperactive.

Experimental period: Hypohidrosis on 5th day. Headache on 8th day. Physical exam on 15 July revealed smooth tongue with tooth marks, enlarged rt. tonsillar node, absent rt. triceps reflex, and flat feet.

Recovery period: Uneventful. Physical exam on 26 July revealed a mild pharyngitis and flat feet.

Subject 80. Negro male, aged 17 years. Past history non-contributory. Physical exam on 20 June revealed hypertrophy of gums, tonsils slightly enlarged bilaterally, moderate follicular hyperkeratosis on knees, split M_1, grade II flat feet, distal segment of left great toe missing, and cremasteric reflexes hypoactive on left and inactive on rt. X-ray negative.

Pre-period: On day 13 complained of pain in lt. testes. The ESR was 0.84mm/min and the hematocrit was 45.4%. Physical exam 4 July revealed slight follicular hyperkeratosis on knees, and slight aciniform eruption on face, neck, and shoulders.

Experimental period: On 8th day complained of headache, dizziness, hunger, and sore rt. knee. Physical exam 15 July revealed bilateral tooth marks on tongue, absent rt. triceps reflex, absent ankle jerks, and diminished knee jerks with reinforcement.

Recovery period: On days 5 - 7 he complained of itchy facial rash. Physical exam on 26 July revealed coated tongue, pharyngitis, slight aciniform eruption of face, and absent ankle jerks.

Subject 81. Negro male, aged 19 years. Past history of episodes of headaches of 1/2-hour duration on hot days. Has occasional nocturia, gonorrhea 1/2 yr. ago treated with penicillin. No food or drug allergy. Physical exam on 20 June revealed bilateral depigmentation around edge of iris, pericornitis of gum posterior to right lower molar, moderate aciniform eruption of face, bilaterally inactive cremasteric reflexes, shotty left inguinal nodes, knee jerks equal and active with reinforcement, and triceps reflexes bilaterally inactive. X-ray negative.

Pre-period: On day 2 complained of sore acne on face. On day 6 complained of toothache, and on day 8 complained of headache. Physical exam 4 July revealed moderate acne form eruption on face, flat feet, and knee jerks equal and active with reinforcement.

Experimental period: Uneventful. Physical exam 15 July revealed mild acne form eruption of face, and wheezes at rt. lung base.

Recovery period: Complained of headache on 4th and 11th day, and anorexia on 7th day. Physical exam on 26 July revealed effanescent wheezes at base of both lungs, shotty left axillary nodes, bilaterally shotty inguinal nodes, rt. knee jerk diminished, ankle jerks absent, and absent triceps reflex on rt.

Subject 82. White male, aged 17 years. Past history of frontal headaches on severe exercise. Leg cramps every two weeks which tend to persist for three nights. Penicillin reaction in 1953. No food allergy. Physical exam on 20 June revealed a fungus dermatitis on medial aspect of rt. ankle, slight aciniform eruption on face, and external hemorrhoids. X-ray negative.

Pre-period: Nasal congestion and frontal headache on 1st day. Canker sore on roof of mouth just behind teeth on 2nd day. Poison ivy rash on scrotum and penis which started on 4th day and became worse on 5th day at which time he was sent to Fort Benjamin Harrison where he remained four days for treatment. On the 5th day the WBC was 7,250 and the differential showed 52% polymorphonuclear leukocytes (7% stab cells), 24% lymphocytes, 8% monocytes, 14% eosinophils, and 2% basophils. On the 10th day he complained of a cold and rhinorrhea. Two days later the ESR was 0.13mm/min and the hematocrit was 45.4%. Physical exam on 4 July revealed a coated tongue, slight aciniform eruption on face, slight miliaria on medial aspect of ankles, and healing poison ivy rash on forearm and groin.

Experimental period: Complained of cramps in arm and leg muscles, dry skin, and had a acetone breath on 6th day. On 7th day rt. earache developed, he had spontaneous epistaxis, and cramps in arm and leg muscles. On this day the WBC was 8,500 and the differential showed 44% polymorphonuclear leukocytes (1% stab cells), 25% lymphocytes, 4% monocytes, 26% eosinophils, and 2% basophils. He was given 600,000 units penicillin and watched closely for a reaction. On 8th day had a severe headache and pinguiculae O.D. On 9th day he was evacuated to Chanute AFB. Physical exam on 15 July revealed enlarged tonsils and large tonsillar nodes on left side. Impression was pharyngitis. Physical exam on 17 July was negative. Subject was discharged from hospital on 19 July and returned to Camp Atterbury.

Recovery period: Subject returned to Camp Atterbury on 5th day of recovery period. On 8th day he complained of hemorrhoids and a burning anus. Physical exam on 26 July revealed rt. ear drum red, slight aciniform eruption of face, ecchymosis (traumatic) rt. axilla, and bilateral shotty cervical and inguinal nodes.

Subject 83. Negro male, aged 17 years. Past history is non-contributory.

Physical exam on 20 June revealed hypertrophic gums and dental caries. X-ray negative.

Pre-period: Complained of headache on 1st and 3rd days, and sore gums on 5th day; physical exam on 4 July revealed a slight aciniform eruption of face, split M_1, shotty lt. inguinal nodes, and flat feet.

Experimental period: Uneventful. Physical exam on 15 July revealed a coated tongue, mild pharyngitis, slight aciniform eruption of face, bilateral inguinal and cervical nodes, and knee jerks diminished with reinforcement.

Recovery period: No complaints. Physical exam on 26 July revealed a mild pharyngitis, evanescent wheezes at both bases, and absent rt. triceps reflex.

Subject 84. White male, aged 20 years. Past history of leg cramps in rainy weather. From 17 to 20 June 1955 he received penicillin for a cold and had no reaction. No food allergy. Physical exam on 20 June revealed a moderate aciniform eruption on face and back, moderately enlarged thyroid, large and tender cervical node at rt. angle of jaw, and bilaterally hyperactive knee and ankle jerks. X-ray negative.

Pre-period: Cold on 1st day and constipated on 3rd day. Physical exam on 4 July revealed a moderately enlarged thyroid, large and tender cervical node at rt. angle of jaw, and moderately hyperactive knee and ankle jerks.

Experimental period: Had gingivitis on 2nd day and anorexia and abdominal pain on 5th day. Physical exam on 15 July revealed a bilateral pinguiculae, mild pharyngitis, and anesthesia of lt. scapula, rt. ant. chest, and lt. ant. lower extremity.

Recovery period: Uneventful. Physical exam on 26 July revealed an infected rt. eardrum, flare of costal cartilages, and anesthesia of ant. thighs.

Subject 85. White male, aged 20 years. Past history of colds and tonsillitis each year for which he has received penicillin with no reaction. No food allergy. Physical exam on 20 June revealed slightly coated tongue, dental caries, slight injection around tonsillar pillars, mild miliaria on ant. aspects of ankles, bilateral cervical nodes, and bilaterally absent triceps reflexes. X-ray negative.

Pre-period: Complained of miliaria of neck on 12th day. Physical exam on 4 July revealed injected tonsillar pillars and pharynx, miliaria on neck and medial aspect of ankles, split M_1, and ankle jerks equal and active with reinforcement.

Experimental period: Complained of hunger, headache and weakness on 2nd day. Had a toothache on 3rd day. Complained of abdominal pain on 4th and 5th days with bilateral cervical and axillary adenopathy on 5th day. On

the 5th day the WBC was 9,000 and the blood smear revealed 59% polymorphonuclear leukocytes (4% stab cells), 39% lymphocytes, 2% monocytes. The ESR was 0.84mm/min and the hematocrit was 47.5%. Physical exam on 15 July revealed a mild pharyngitis, absent ankle jerks, absent biceps reflexes, and dry skin on forearms.

Recovery period: Uneventful. Physical exam on 26 July revealed a mild pharyngitis and absent ankle jerks.

Subject 86. White male, aged 19 years. Past history of occasional leg cramps at night, numerous colds, and has coughed up blood. Furuncle rt. 4th finger treated with penicillin and no reaction. Physical exam on 20 June revealed an acute pharyngitis, fair oral hygiene, moderate aciniform eruption on face, bilateral inspiratory and expiratory basilar wheezes, and bilateral axillary nodes. X-ray negative.

Pre-period: Complained of head cold on 3rd day and rash in groin on 11th day. Physical exam on 4 July revealed a coated tongue, enlarged tonsils, slight aciniform eruption on face, bilateral shotty inguinal nodes, and flat feet.

Experimental period: Complained of anorexia, nausea, and abdominal pain on 2nd day. Abdominal pain on 4th day. On 7th and 8th days complained of abdominal pain with heartburn. Hemoptysis and nasal congestion on 8th day. Physical exam on 15 July revealed a slight aciniform eruption on face, rhonchi in rt. lung base, absent rt. triceps and lt. biceps reflexes.

Recovery period: Complained of heartburn on 4th day. Physical exam on 26 July revealed a slight aciniform eruption on face.

Subject 87. Negro male, aged 17 years. Gained 40 pounds in basic training. No food or drug allergy. Physical exam on 20 June revealed obesity, lordosis, large lips, pterygia O.S., diplopia with extreme convergence, bilaterally hypertrophic tonsils, hypertrophic gums, fair oral hygiene, soft velvety skin, area of depigmentation on inner aspect of left thigh, bilateral gynecomastia, bilaterally absent cremasteric reflexes, moderate epidermophytosis, grade II flat feet, knee jerks equal and active with reinforcement, and somewhat juvenile male genitalia. X-ray negative.

Pre-period: Sore left index finger on 1st day. Rash in groin and itchy ears on 8th day. Complained of insomnia on 9th day and dizziness on 12th day. Physical exam on 4 July revealed no new endocrine changes, enlarged and injected tonsils, split M_1, absent cremasteric reflexes, and chronic epidermophytosis.

Experimental period: On 2nd day he had anorexia, slight vertigo, dysuria. On 3rd day he again complained of vertigo and dysuria along with RUQ pain. On the 3rd day the WBC was 12,700 and the differential showed 30% polymorphonuclear leukocytes, 61% lymphocytes, 3% monocytes, 6% eosinophils. A urinalysis was negative for sugar, albumin, urobilinogen and acetone.

The microscopic examination revealed 7-10 WBC per high power field, occasional crystals and epethelial cells. On the 5th day the WBC was 11,950 and the differential contained 34% polymorphonuclear leukocytes (2% stab cells), 58% lymphocytes, 5% eosinophils, 2% basophils, and 2% monocytes. A microscopic urinalysis revealed no significant cells. Serum amylase, however, was 200 and he was taken off experimental regimen. For next five days he showed slight signs of improvement. On 9th day he was air-evacuated to Chanute AFB, and physical exam revealed postnasal drip and shotty post. axillary nodes bilaterally. The impression was dehydration with possible cystitis; rule out infections mononucleosis. Laboratory data was normal. Heterophil agglutination titer was 1:14. Subject returned to Camp Atterbury after five days' hospitalization at Chanute.

Recovery period: Subject returned to Camp Atterbury on the 5th day of the recovery period. On 8th day he had abdominal pains. On 9th day LUQ pains more severe and he had a headache and dysuria and complained of anorexia. On this day the WBC was 10,450 and the differential revealed 51.5% polymorphonuclear leukocytes, 35% lymphocytes, 3% monocytes, 9% eosinophils, 1.5% basophils. A urinalysis was negative for sugar, albunin but there were 0-2 RBC and 0-1 WBC per high power field. On 11th day he had RLQ pains. Physical exam on 26 July revealed no further endocrine changes, pharyngitis, RLQ tenderness, and rt. ankle jerk absent with reinforcement.

Subject 88. White male, aged 18 years. Past history of appendectomy nine months ago. Penicillin given with no reaction. No food allergy. Physical exam on 20 June revealed tooth markings on anterior margins of tongue, dental caries, moderate aciniform eruption on shoulders, and moderately enlarged thyroid. X-ray negative.

Pre-period: Uneventful except for runny nose on 4th day. Physical exam on 4 July essentially negative.

Experimental period: He was admitted to Sick Bay on the 2nd day. He had rales and wheezes in both lungs, friction rubs, abdominal pains, toothache, and was not sweating. On the 3rd day penicillin and sulfadiazine therapy was instituted. On the 5th day the WBC was 8,800 and the differential revealed 56% polymorphonuclear leukocytes (14% stab cells), 41% lymphocytes, and 3% eosinophils. The urinalysis was negative for acetone, sugar, albumin, and urobilinogen; there were no significant cells. He was taken off the experimental diet on the 6th day. Symptons persisted to the 9th day when he was air-evacuated to Chanute AFB. A physical exam on 15 July revealed harsh breath sounds and dullness to percussion over rt. lower lung fields. Impression was pneumonitis of rt. lower lung. X-ray was negative on 16 July and subject was afebrile and feeling well. Impression was acute bronchitis rt. lower lung. X-ray and physical exams on 20 July were negative. Subject was discharged from hospital on 22 July.

Subject 99. Negro male, aged 17 years. Past history is non-contributory. No food or drug allergy. Physical exam on 20 June revealed a lateral squint O.S., hypertrophy of gums, dental caries, slight follicular

hyperkeratosis of elbows and knees, and fungus dermatitis of feet. X-ray negative.

Pre-period: Uneventful. Physical exam on 4 July revealed shotty rt. inguinal nodes.

Experimental period: No complaints. Physical exam on 15 July essentially negative.

Recovery period: Uneventful. Physical exam on 26 July revealed a coated tongue, post nasal drip, and bilaterally shotty inguinal and axillary nodes.

Subject 100. White male, aged 19 years. Past history of boils under arms during hot weather. Distal phalanx of 4th finger lt. hand missing due to traumatic injury. No food or drug allergy. Physical exam on 20 June revealed a moderate obesity, tooth markings on rt. lateral margin on tongue, circular red rash on left buttocks, athletes foot, and red area of pigmentation on LLQ about size of a silver dollar. X-ray negative.

Pre-Period: Complained of miliaria of shoulders on 1st day. Had a heat rash of shoulders on 13th day. Physical examination on 4 July revealed a moderate obesity, tooth marks on lateral margin of tongue, fungus dermatitis of buttocks, miliaria of shoulders, external hemorrhoid, bilaterally hypoactive knee jerks.

Experimental period: Uneventful. Physical exam on 15 July revealed a mild pharyngitis, insp. wheezes at lt. apex and rt. base, rt. triceps reflex absent, and left triceps reflex diminished.

Recovery period: Uneventful. Physical exam on 26 July revealed a left costa-vertebral angle and LUQ tenderness.

Subject 101. White male, aged 17 years. Past history of hepatitis, 4 1/2 years ago with yellow jaundice, dark urine, and poor appetite. No food or drug allergy. Hospitalized for T & A. Physical exam on 20 June revealed a slight bilateral ptosis, canker sore on gum, and moderate aciniform eruption on face. X-ray negative.

Pre-period: Complained of headache on 1st day. Had an epidermophytosis of left foot on 2nd day and which spread to rt. foot by 6th day. Physical exam on 4 July revealed knee jerks equal and active with reinforcement.

Experimental period: Uneventful. On the 10th day a urinalysis was performed and was negative for sugar and albumin; the microscopic contained no significant cells. Physical exam on 15 July revealed a slightly infected lt. eardrum, wheezes in left base, and bilaterally absent biceps and triceps reflexes.

Recovery period: Insp. wheezes in rt. apex on 1st day. Physical exam on 26 July revealed broncchi and friction rub lt. base, bilaterally diminished knee jerks, and bilaterally absent ankle jerks.

APPENDIX V

METEOROLOGICAL OBSERVATIONS

LIST OF TABLES

TABLE AV.1

DAILY WEATHER OBSERVATIONS

(1) Barometric Pressure, in.; (2) Dry Bulb Temp., °F; (3) Wet Bulb Temp., °F; (4) Dew Point, °F; (5) Relative Humidity, %; (6) Wind Direction, 10's of Degrees; (7) Wind Speed, m.p.h.; (8) Precipitation, in., (9) Condition of Ground

Time of Observation	Date	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	June									
0730	21	29.20	81.2	69.7	64.2	56	Calm	Calm	0.00	Dry
1230	21	29.15	88.1	72.0	65.0	46	230	12	0.00	Dry
1630	21	29.14	79.9	70.0	65.0	61	230	05	T	Dry
0730	22	29.20	73.2	64.1	59.0	61	230	03	0.00	Dry
1230	22	29.20	84.0	64.0	51.0	32	310	11	0.00	Dry
1630	22	29.17	82.5	66.5	57.5	43	310	04	0.00	Dry
0730	23	29.20	68.0	64.0	62.0	81	230	03	.01	Moist
1230	23	29.17	78.0	64.1	56.0	46	230	04	0.00	Dry
1630	23	29.13	80.2	65.2	56.4	44	320	05	0.00	Dry
0730	24	29.23	66.0	59.0	51.0	57	Calm	Calm	0.00	Dry
1230	24	29.20	78.8	64.8	56.8	47	210	03	0.00	Dry
1700	24	29.16	76.0	68.0	64.0	67	Calm	Calm	0.00	Dry
0730	25	29.12	66.4	66.2	65.8	99	03	14	.40	Wet
1230	25	29.11	65.0	64.0	63.0	95	03	07	.20	Wet
1630	25	29.20	70.8	65.3	62.8	75	07	04	T	Wet
0730	26	29.28	68.2	57.4	49.6	52	360	05	0.00	Moist
1230	26	29.24	79.9	63.2	53.4	39	04	06	0.00	Dry
1630	26	29.22	78.2	61.7	50.4	38	360	05	0.00	Dry
0730	27	29.38	76.0	65.0	59.0	55	360	07	0.00	Dry
1230	27	29.40	74.2	61.8	54.1	49	360	04	0.00	Dry
1630	27	29.41	82.1	65.0	55.9	40	360	05	0.00	Dry
0730	28	29.42	74.8	63.8	57.6	55	180	07	0.00	Dry
1230	28	29.41	83.0	65.0	54.0	38	Calm	Calm	0.00	Dry
1630	28	29.37	81.8	65.3	55.8	40	180	05	0.00	Dry
0730	29	29.37	69.0	65.0	63.0	81	180	05	0.00	Dry
1230	29	29.30	85.0	61.8	45.4	26	180	06	0.00	Dry
1630	29	29.29	90.0	73.0	65.0	44	170	04	0.00	Dry

TABLE AV.1 (Contd)

Time of Observation	Date	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	June									
0730	30	29.23	80.8	70.2	65.2	60	250	10	0.00	Dry
1230	30	29.24	84.6	67.1	58.6	40	180	04	0.00	Dry
1630	30	29.30	89.9	70.4	61.0	38	190	04	0.00	Dry
	July									
0730	1	29.22	74.0	67.0	64.0	70	180	06	0.00	Dry
1230	1	29.18	90.0	75.0	69.0	50	200	17	0.00	Dry
1630	1	29.17	86.0	69.0	60.0	42	200	05	0.00	Dry
0730	2	29.28	82.0	74.0	71.0	69	200	04	0.00	Dry
1230	2	29.27	91.0	77.0	72.0	54	090	03	0.00	Dry
1630	2	29.26	91.5	78.0	73.0	56	090	02	0.00	Dry
0730	3	29.40	87.0	76.0	72.0	61	Calm	Calm	0.00	Dry
1230	3	29.38	94.8	76.3	68.8	43	270	04	0.00	Dry
1630	3	29.37	92.1	77.1	70.1	51	270	04	0;00	Dry
0730	4	29.37	76.0	67.0	66.0	63	Calm	Calm	UNK	Wet
1230	4	29.22	93.0	78.0	72.0	52	270	04	0.00	Moist
1630	4	29.23	85.0	73.0	68.0	51	360	07	0.00	Dry
0730	5	29.27	77.0	70.0	67.0	71	Calm	Calm	0.00	Dry
1230	5	29.22	92.5	76.0	69.5	47	Calm	Calm	0.00	Dry
1630	5	29.22	84.2	72.1	65.4	56	Calm	Calm	0.00	Dry
0730	6	29.18	83.0	74.0	70.0	66	180	02	0.00	Dry
1230	6	29.16	92.5	77.0	71.0	50	Calm	Calm	0.00	Dry
1630	6	29.15	88.5	72.5	65.5	46	Calm	Calm	0.00	Dry
0730	7	29.07	77.0	73.0	71.0	83	180	04	0.00	Dry
1230	7	29.07	87.0	75.0	70.0	58	180	08	0.00	Dry
1630	7	29.06	85.2	72.1	64.5	54	230	04	0.00	Dry
0730	8	29.05	74.0	73.0	73.0	95	270	06	UNK	Wet
1230	8	29.06	84.5	80.0	78.5	82	220	04	0.00	Dry
1630	8	29.12	88.0	83.0	81.0	81	270	06	0.00	Dry
0730	9	29.24	87.2	82.1	79.3	81	270	06	0.00	Dry
1230	9	29.25	97.0	82.0	77.0	53	230	08	0.00	Dry
1630	9	29.25	88.0	83.0	81.0	81	220	04	0.00	Dry
0730	10	29.26	82.0	74.0	71.0	69	220	06	0.00	Dry
1230	10	29.26	91.3	80.2	76.2	62	190	05	0.00	Dry
1630	10	29.27	96.3	81.1	75.9	53	170	09	0.00	Dry

TABLE AV.1 (Contd)

Time of Observation	Date	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	July									
0730	11	29.28	80.0	72.0	69.0	68	100	08	0.00	Dry
1230	11	29.28	90.0	72.0	64.0	42	090	09	0.00	Dry
1630	11	29.29	92.0	71.0	61.0	35	090	10	0.00	Dry
0730	12	29.33	84.6	72.1	66.6	55	090	12	0.00	Dry
1230	12	29.344	92.2	72.8	64.3	40	080	04	0.00	Dry
1630	12	29.346	87.6	67.1	55.6	34	090	04	0.00	Dry
0730	13	29.33	74.0	67.0	64.0	70	100	05	0.00	Dry
1230	13	29.33	90.2	68.1	56.0	32	090	03	0.00	Dry
1630	13	29.34	87.6	67.1	55.6	34	Calm	Calm	0.00	Dry
0730	14	29.26	83.0	75.0	72.0	70	100	04	0.00	Dry
1230	14	29.16	89.0	77.0	72.0	59	180	13	0.00	Dry
1630	14	29.12	75.0	74.8	74.8	99	180	03	UNK	Wet
0730	15	29.10	73.5	72.9	72.5	98	200	06	UNK	Wet
1230	15	29.05	81.0	77.0	76.0	84	170	04	0.00	Wet
1630	15	29.04	82.0	73.0	69.0	65	Calm	Calm	0.00	Damp
0730	16	29.04	74.0	69.0	67.0	78	Calm	Calm	UNK	Wet
1230	16	29.10	86.1	76.1	72.0	63	Calm	Calm	0.00	Damp
1630	16	29.11	88.0	78.0	74.0	64	Calm	Calm	UNK	Wet
0730	17	29.20	77.0	72.0	70.0	79	180	04	0.00	Wet
1230	17	29.21	87.0	77.0	73.0	64	360	03	0.00	Wet
1630	17	29.19	85.0	76.0	72.0	63	360	03	0.00	Damp
0730	18	29.27	74.0	73.8	73.8	99	Calm	Calm	UNK	Wet
1230	18	29.28	80.0	75.0	73.0	79	Calm	Calm	UNK	Wet
1630	18	29.32	75.0	70.0	68.0	78	Calm	Calm	UNK	Wet
0730	19	29.36	77.0	70.0	67.0	71	090	06	0.00	Dry
1230	19	29.37	86.0	75.0	71.0	60	090	10	0.00	Dry
1630	19	29.36	85.0	76.0	72.0	67	080	05	Trace	Dry
0730	20	29.30	84.0	76.0	73.0	70	120	04	0.00	Dry
1230	20	29.30	89.0	75.0	69.0	53	130	05	0.00	Dry
1630	20	29.31	88.5	74.0	67.8	50	120	04	0.00	Dry
0730	21	29.28	81.5	75.5	56.5	43	160	05	0.00	Dry
1230	21	29.26	89.0	75.0	69.0	53	090	06	0.00	Dry
1630	21	29.32	86.5	74.5	69.5	57	090	04	0.00	Dry
0730	22	29.28	81.5	75.5	73.5	76	100	03	0.00	Dry

TABLE AV.1 (Contd)

Time of Observation	Date	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	July									
1230	22	29.27	97.5	77.5	69.5	40	Calm	Calm	0.00	Dry
1630	22	29.25	95.5	74.0	64.5	36	Calm	Calm	0.00	Dry
0730	23	29.21	86.5	77.0	73.5	65	Calm	Calm	0.00	Dry
1230	23	29.14	91.0	80.0	76.0	62	Calm	Calm	0.00	Dry
1630	23	29.15	87.0	74.5	69.5	57	Calm	Calm	0.00	Dry
0730	24	29.10	75.5	72.0	70.5	85	360	05	0.00	Dry
1230	24	29.12	87.5	76.5	72.5	61	360	06	0.00	Dry
1630	24	29.16	80.0	76.0	75.0	83	080	05	UNK	Wet
0730	25	29.20	78.0	72.0	69.0	75	350	04	UNK	Wet
1230	25	29.23	87.5	74.0	68.5	53	Calm	Calm	0.00	Damp
1630	25	29.27	88.0	73.0	66.0	49	Calm	Calm	0.00	Dry
0730	26	29.28	85.5	77.0	73.5	69	Calm	Calm	0.00	Dry
1230	26	29.29	98.5	78.5	71.0	41	320	03	0.00	Dry
1630	26	29.29	96.0	76.0	68.0	40	330	04	0.00	Dry
0730	27	29.30	92.0	77.0	71.0	51	310	04	0.00	Dry
1230	27	29.32	10.4	75.0	62.0	25	Calm	Calm	0.00	Dry
1630	27	29.31	97.0	77.0	69.0	41	320	05	0.00	Dry

TABLE AV.2

WEATHER DURING HEAT ACCLIMATIZATION TESTS

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 1: 26 June 1955, 1300 Hours (Scattered Clouds; No Precipitation)			
0	79.9	63.2	38	291
30	78.8	64.7	47	229
60	80.1	65.7	47	220
90	79.9	62.8	38	356
120	82.5	65.2	41	350
Mean	80.4	64.3	41	289

Effective Temperature = 65.1°F

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 2: 26 June 1955, 1500 Hours (Scattered Clouds; No Precipitation)			
0	82.5	65.2	41	350
30	80.3	62.0	35	266
60	80.2	62.4	35	280
90	77.5	62.0	38	371
120	78.2	61.7	37	364
Mean	79.7	62.6	38	322

Effective Temperature = 70.2°F

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 3: 27 June 1955, 1300 Hours (Scattered Clouds; No Precipitation)			
0	74.2	61.8	50	389
30	84.1	65.2	35	338
60	80.2	60.2	29	209
90	84.9	66.9	37	253
120	87.8	65.0	28	588
Mean	82.2	63.8	37	356

Effective Temperature = 65.5°F

TABLE AV.2 (Contd)

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 4: 27 June 1955, 1500 Hours (Scattered Clouds; No Precipitation)			
0	87.8	65.0	28	588
30	86.2	64.2	29	216
60	85.0	64.8	33	167
90	82.1	65.0	40	306
120	83.0	65.0	38	329
Mean	84.8	64.8	33	321

Effective Temperature = 67.8°F

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 1: 2 July 1955, 1300 Hours (Scattered Clouds; No Precipitation)			
0	91.0	77.0	45	292
30	94.1	99.1	52	348
60	93.0	78.0	52	494
90	95.2	78.3	47	284
120	95.8	80.0	50	256
Mean	93.8	78.5	49	335

Effective Temperature = 79.8°F

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 2: 2 July 1955, 1500 Hours (Scattered Clouds; No Precipitation)			
0	95.8	80.0	50	256
30	98.8	78.3	41	108
60	95.9	77.4	44	134
90	91.5	78.0	56	338
120	90.0	78.0	59	284
Mean	94.8	78.3	50	224

Effective Temperature = 80.8°F

TABLE AV.2 (Contd)

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 3: 3 July 1955, 1300 Hours (Scattered Clouds; No Precipitation)			
0	94.8	76.3	42	257
30	94.0	75.0	41	232
60	96.1	76.0	40	193
90	94.9	78.8	50	283
120	95.8	79.3	49	265
Mean	95.1	77.1	44	246

Effective Temperature = 80.0°F

Lapsed Time (min)	Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 4: 3 July 1955, 1500 Hours (Scattered Clouds; No Precipitation)			
0	95.8	79.3	49	265
30	96.9	77.4	42	125
60	95.5	77.0	44	149
90	94.0	77.0	46	200
120	91.0	75.0	57	244
Mean	94.6	77.1	49	197

Effective Temperature = 79.5°F

Lapsed Time (min)	Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 1: 10 July 1955, 1300 Hours (Scattered Clouds; No Precipitation)			
0	91.3	80.2	62	284
30	99.2	82.1	49	149
60	99.0	76.0	35	171
90	94.2	80.0	54	199
120	96.3	81.1	53	204
Mean	96.0	79.9	50	201

Effective Temperature = 82.4°F

TABLE AV.2 (Contd)

Lapsed Time (min)	Temperature, °F Dry Bulb	Temperature, °F Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 2: 10 July 1955, 1530 Hours (Scattered Clouds; No Precipitation)			
0	96.3	81.1	53	204
30	95.7	80.4	53	175
60	95.6	77.5	45	328
90	96.0	77.0	42	317
120	91.2	75.1	48	256
Mean	94.9	78.2	47	256

Effective Temperature = 80.5°F

Lapsed Time (min)	Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 3: 11 July 1955, 1300 Hours (Clear; No Precipitation)			
0	90.0	72.0	42	488
30	91.8	70.4	35	374
60	90.5	71.3	39	474
90	97.1	73.6	33	273
120	92.0	71.0	35	576
Mean	92.3	71.7	37	477

Effective Temperature = 74.2°F

Lapsed Time (min)	Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 4: 11 July 1955, 1500 Hours (Clear; No Precipitation)			
0	92.0	71.0	35	576
30	95.3	70.2	28	230
60	94.8	70.0	28	356
90	95.0	71.0	30	275
120	94.4	70.4	29	249
Mean	94.3	70.5	29	337

Effective Temperature = 75.8°F

TABLE AV.2 (Contd)

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 1: 19 July 1955, 1300 Hours (Overcast & Broken Clouds; No Precipitation)			
0	82.0	76.0	76	185
30	82.0	76.0	76	167
60	84.0	77.0	73	72
90	88.0	78.0	64	132
120	90.0	78.0	59	520
Mean	85.2	77.0	70	215

Effective Temperature = 75.4°F

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 2: 19 July 1955, 1500 Hours (Overcast & Broken Clouds; No Precipitation)			
0	90.0	78.0	59	520
30	91.0	78.0	57	328
60	92.0	78.0	54	369
90	84.0	76.0	70	309
120	84.0	76.0	70	249
Mean	88.2	77.2	62	355

Effective Temperature = 75.5°F

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 3: 20 July 1955, 1300 Hours (Scattered & Broken Clouds; No Precipitation)			
0	88.0	76.0	58	124
30	98.0	76.0	36	225
60	97.0	80.0	48	328
90	96.0	80.0	25	375
120	96.0	80.0	25	328
Mean	90.0	78.4	38	276

Effective Temperature = 78.0°F

TABLE AV.2 (Contd)

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 4: 20 July 1955, 1500 Hours (Broken Clouds; No Precipitation)			
0	96.0	80.0	25	315
30	97.0	80.0	48	208
60	87.0	77.0	64	269
90	85.0	77.0	70	344
120	84.0	77.0	73	329
Mean	89.8	78.2	56	293

Effective Temperature = 77.8°F

Lapsed Time (min)	Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 1: 24 July 1955, 1300 Hours (Overcast; No Precipitation)			
0	87.5	76.5	61	222
30	92.0	78.0	54	197
60	85.0	74.0	60	202
90	84.0	75.0	66	245
120	85.0	77.0	70	268
Mean	86.7	76.1	63	227

Effective Temperature = 75.5°F

Lapsed Time (min)	Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 2: 27 July 1955, 1200 Hours (Broken Clouds; Light Rain)			
0	85.0	77.0	70	268
30	85.0	75.0	63	188
60	77.5	77.0	98	168
90	79.0	76.0	87	195
120	80.0	75.0	79	204
Mean	81.3	76.0	79.4	205

Effective Temperature = 72.5°F

TABLE AV.2 (Contd)

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 3: 25 July 1955, 1300 Hours (Scattered & Broken Clouds; No Precipitation)			
0	97.0	75.0	36	222
30	99.0	78.0	40	196
60	95.0	75.0	40	130
90	94.0	75.0	41	273
120	97.0	75.0	36	284
Mean	96.4	75.6	38.6	221

Effective Temperature = 80.0°F

Lapsed Time (min)	Temperature, °F Dry Bulb	Wet Bulb	Rel. Hum. %	Wind Speed (Ft/min)
	Flight 4: 25 July 1955, 1500 Hours (Scattered & Broken Clouds; No Precipitation)			
0	97.0	75.0	36	221
30	98.0	76.0	36	149
60	88.0	70.0	41	285
90	94.0	72.0	60	229
120	95.0	74.0	37	248
Mean	94.0	73.4	49	226

Effective Temperature = 77.8°F

APPENDIX VI

FORMS

An integral part of a large scale investigation in the field is the systematic collection and recording of observations and measurements. Where there are both many observers and numerous subjects, it is vital that nothing, however insignificant it may appear, be overlooked. The various forms given in the following pages are new ones which were used only in the summer (1955) tests. For other forms carried over from previous trials, the reader is referred to WADC TR 53-484, Part 3, Volume II, pp. 675-706. The forms are included because they serve to describe our methods of investigation. Possibly these forms will be of assistance to subsequent research workers.

TABLE AVI.1

RESTING METABOLISM - DATA AND CALCULATIONS

SUBJECT #: NAME:

DATE: TIME: BAROMETER. OPERATOR:

HEIGHT: WEIGHT: SURFACE AREA:

UNIT #: CORRECTIONS: M1______ M2______

M3______ M3 CO_2______ M3 O_2______

RUN #1 START END MINS.

	M1 Reading	T	M2 Reading	T	M3 Reading	T
End						
Start	______	______	______	______	______	______
Diff.						
STP						
Meter Corr.						
M3 Corr.	______		______		______	
Diff.						

O_2 ml/min.______ CO_2 ml/min.______ RQ______ PV 1/min.______

Time for 10 expirations: Resp./min.:

RUN #2 START END MINS.

	M1 Reading	T	M2 Reading	T	M3 Reading	T
End						
Start	______	______	______	______	______	______
Diff.						
STP						
Meter Corr.						
M3 Corr.	______		______		______	
Diff.						

O_2 ml/min.______ CO_2 ml/min.______ RQ______ PV 1/min.______

Secs. for 10 expirations: Resp./min.:

TABLE AVI.2

RESTING METABOLISM TEST-SUMMARY

SUBJECT # ____________ NAME ______________________

DATE ____________ TIME OF DAY ______________________

PASSAGE OF TIME

20 seconds ______________ sec.

45 seconds ______________ sec.

70 seconds ______________ sec.

ELECTROENCEPHALOGRAM (check)

Resting ________ Hyperventilation ________ Posthyperventilation ________

MAXIMAL HYPERVENTILATION (15 seconds)

Dial Reading	End		liters
	Start	---	liters
	Diff.		

RESPIRATORY METABOLISM

	Pulmonary Ventilation L/min.	Oxygen Consumption ml/min.	CO_2 Production ml/min.	R.Q.	Heat Production Cal./m^2/hr.	Resp. Rate /min.
Run 1						
Run 2						
Mean						

Remarks:

TABLE AVI.3

SECONDS CONVERTED TO
HUNDREDTHS OF MINUTE

Time, hundredths of minute = secs/60

Seconds	0	1	2	3	4	5	6	7	8	9
	Hundredths of Minute									
0	.00	.02	.03	.05	.07	.08	.10	.12	.13	.15
10	.17	.18	.20	.22	.23	.25	.27	.28	.30	.32
20	.33	.35	.37	.38	.40	.42	.43	.45	.47	.48
30	.50	.52	.53	.55	.57	.58	.60	.62	.63	.65
40	.67	.68	.70	.72	.73	.75	.77	.78	.80	.82
50	.83	.85	.87	.88	.90	.92	.93	.95	.97	.98
60	1.00	--	--	--	--	--	--	--	--	--

TABLE AVI.4

THREE-HOUR TEST

Subject's Code No. ____________ Subject's Name ____________ Date ____

Time of Test: 0600-0900; 0900-1200 (Circle correct period)

Time of final voiding ________hr.

Time of initial voiding ________hr.

Lapsed Time ______________min. Volume __________ ml.

Urine flow ______________ml/min.

Time of venipuncture ________hr.

Oral Temperature (5 min.) ______ °F Respiratory rate __________

Blood Pressure and Pulse Rate:

	Lying, after 30 min. rest	Standing, immediately	Change
Systolic	____________	____________	________
Diastolic	____________	____________	________
Pulse Rate	____________	____________	________

Skinfold Thickness:

a. Above right nipple __________ mm.

b. Dorsal aspect right upper arm ____________ mm.

c. Right of umbilicus __________ mm.

d. Per cent body fat __________ %

Electrocardiogram

________(Check)

TABLE AVI.5

HEAT ACCLIMATIZATION TEST
(Physiological Data)

Subject's Name ______________ Code No. ____________ Date ___________

Time of March ______________ Lapsed Time ____________________ min.
Begin - End

Body Weight:

Final ________ lbs. oz.

Initial ________ lbs. oz.

Loss ________ lbs. oz.

Rectal Temperature:

Final ____ °C ____ °F

Initial ____ °C ____ °F

Rise ____ °C ____ °F

Pulse Rate:

Final ________

Initial ________

Rise ________

Skin Temperature Under Glove

Final _____ °C _____ °F

Initial _____ °C _____ °F

Rise _____ °C _____ °F

Skin Temperature Upper Arm

Final _____ °C _____ °F

Initial _____ °C _____ °F

Rise _____ °C _____ °F

Glove Sweat:

Total Volume ________ ml.

Rate of Sweating ________ ml/hr.

Body Weight (Total Body Sweat):

Total Loss ________ gm.

Rate of Loss ________ gm/hr.

Urine:	Exercise	Post Exercise
Time of final voiding	________ hr.	________ hr.
Time of initial voiding	________ hr.	________ hr.
Lapsed Time	________ min.	________ min.
Volume	________ ml.	________ ml.
Urine flow	________ ml/min.	________ ml/min.

Observations:

TABLE AVI.6

HEAT ACCLIMATIZATION TEST
(Meteorological Data)

Flight Tested ________ Time of Test ________ Date ________

State of Sky ________ Precipitation ________

Clock Time	Lapsed Time min.	Temperature Dry Bulb	Temperature Wet Bulb	Relative Humidity
____	0	____	____	____
____	30	____	____	____
____	60	____	____	____
____	90	____	____	____
____	120	____	____	____
Mean		____	____	____

Clock Time	Lapsed Time min.	Wind Velocity Time	Wind Velocity Feet	Wind Velocity Feet/min	m.p.h.
____	0	____	____	____	____
____	30	____	____	____	____
____	60	____	____	____	____
____	90	____	____	____	____
____	120	____	____	____	____
Mean		____	____	____	____

TABLE AVI.7

WATER DIURESIS TEST

Subject's Code No. ________ Subject's Name ______________ Date ______

Weight on day prior to test __________ lb

Total dose of water 9.1 x __________ lb = __________ ml

Basal Urine Flow:

Exact time of 0800 voiding ________

Exact time of 0630 voiding ________

Volume ________ ml

Urine flow __________ ml/hr

First Hour (Oral dose ingested 0800-0845):

Exact time of 0900 voiding ________

Exact time of 0800 voiding ________

Volume ________ ml

Urine flow __________ ml/hr

Second Hour:

Exact time of 1000 voiding ________

Exact time of 0900 voiding ________

Volume ________ ml

Urine flow __________ ml/hr

Third Hour:

Exact time of 1100 voiding ________

Exact time of 1000 voiding ________

Volume ________ ml

Urine flow __________ ml/hr

Fourth Hour:

Exact time of 1200 voiding ________

Exact time of 1100 voiding ________

Volume ________ ml

Urine flow __________ ml/hr

Total Volume (0800-1200):

______________ ml

Calculations:

Volume (0800-1200) ________ ml

Basal Flow ______ ml/hr x 4 = ______ ml

Corrected Diuretic Volume ________ ml

Water Load ________ ml

$$\% \text{ Recovery} = \frac{\text{Corrected Diuretic Vol.}}{\text{Water Load}} \times 100 = \frac{\_\_\_\_\_\_ \text{ ml}}{\text{ml}} \times 100 = \_\_\_\_\_\_$$

Additional Data:

1. Fluid intake during remainder of 24-hr period ________ ml
2. Urine volume during remainder of 24-hr period ________ ml
3. Time of collection ________ hr
4. Urine flow ________ ml/hr
5. Osmolarity of urine on day preceding test ________ mOsm/L

TABLE AVI.8

WATER DIURESIS TEST: CONVERSION TABLE*

Body Weight	Oral Dose, ml									
lb.	0	1	2	3	4	5	6	7	8	9
100	910	920	930	935	945	955	965	975	985	990
110	1000	1010	1020	1030	1035	1045	1055	1065	1075	1085
120	1090	1100	1110	1120	1130	1140	1145	1155	1165	1175
130	1185	1190	1200	1210	1220	1230	1240	1245	1255	1265
140	1275	1285	1295	1300	1310	1320	1330	1340	1345	1355
150	1365	1375	1385	1390	1400	1410	1420	1430	1440	1445
160	1455	1465	1475	1485	1490	1500	1510	1520	1530	1540
170	1545	1555	1565	1575	1585	1590	1600	1610	1620	1630
180	1640	1645	1655	1665	1675	1685	1695	1700	1710	1720
190	1730	1740	1745	1755	1765	1775	1785	1795	1800	1810
200	1820	1830	1840	1845	1855	1865	1875	1885	1895	1900
210	1910	1920	1930	1940	1945	1955	1965	1975	1985	1995
220	2000	2010	2020	2030	2040	2050	2060	2065	2075	2085
230	2095	2100	2110	2120	2130	2140	2150	2160	2165	2175
240	2185	2195	2200	2210	2220	2230	2240	2250	2260	2265
250	2275	2285	2295	2300	2310	2320	2330	2340	2350	2360

* Body wt (lb) x 9.1 = Oral Dose (ml). Answer rounded to nearest 5 ml.

TABLE AVI.9

BODY WATER, D_2O Calculations, Summer 1955

Specimen No. and Date	Collection Period Hrs.	Vol. ml	D_2O in Original Urine %	D_2O Lost, in grams				D_2O Admin.	D_2O Remaining	D_2O Space	
				Urine	Sweat + I.W.*	Σ	$\frac{\Sigma}{2}$			Liters	%

TABLE AVI.10

Date ____________
Period ____________

SERUM AMYLASE

Flight 1

Subject No.	Optical Density Duplicates				Δ O.D.	Amylase Units	Remarks
	Amylase		Control				
Blank							
Starch Bl.							
Standard							
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
90							
91							
92							

Date ______
Period ______

TABLE AVI.11

SEDIMENTATION RATE AND HEMATOCRIT

Flight 1

Temperature ______

Subject No.	Initial Volume	Sedimentation Rate (Minutes)							Hematocrit		Corrected E.S.R.
		0	10	20	30	40	50	60	60 min.	%	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
90											
91											
92											

TABLE AVI.12

DIFFERENTIAL COUNT

Date __________
Period __________

Flight I

Subject Code No.	L	P	E	B	M	Remarks	Total
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
90							
91							
92							

Subject Code No.________
Activity________
Water________
Diet________

TABLE AVI.13

FECAL DATA SHEET

Mo.	Day	Stool Weight		Car-mine Tint	Incl. in Pool	Dil. of Pool	Label on Pool	Remarks
		Carton	Corrected					

TABLE AVI.14

STANDARD SUMMARY SHEET

TABLE __________ __________ WORK

____

Experimental Regimen		PRE I	PRE II	EXP I	EXP II	REC I	REC II
ST 0	U						
	L						
0/100/0	U						
1000	L						
0/100/0	U						
2000	L						
2/20/78	U						
1000	L						
2/20/78	U						
2000	L						
15/52/33	U						
1000	L						
15/52/33	U						
2000	L						
15/52/33	U						
3000	L						
30/0/70	U						
1000	L						
30/0/70	U						
2000	L						
Control	U						
	L						

APPENDIX VII

FAILURE OF KIDNEY TO DISTINGUISH BETWEEN ORGANIC AND INORGANIC OSMOLS

(by G. N. Wogan)

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A. INTRODUCTION

In order to study further the relationship between osmotic excretion and water diuresis, a second series of experiments was designed to be carried out on a small number of subjects. Several basic hypotheses were advanced for experimental proof. First, it was desired to demonstrate the apparent interdependence between osmotic load and water diuresis in dehydrated subjects to be a reproducible phenomenon, particularly at the extremes of osmotic load range.

A second question put forth was whether the diuresis produced by water in a dehydrated subject on a low osmotic regimen could be prevented simply by providing additional osmols for excretion by supplementation of osmotic intake. If this reversal occurred, the implication would then be that the effects on diuresis were, in fact, due to urinary osmotic excretion (or some related parameter) and not to a specific ionic or other characteristic of the high osmotic regimens. Thus, in effect, osmotic-depletion hydropenia could be converted to simple water-depletion hydropenia by regulating the osmotic intake during the period of dehydration.

A third inquiry was designed to determine whether the nature of the osmotic particles contributing to urinary osmotic excretion was a determining factor in the antidiuretic action of the high osmotic regimens. To study this portion of the general hypothesis, it was decided to add osmols to the lowest osmotic regimen (carbohydrate) in two forms, one electrolytic, the other as a non-electrolyte. Osmotic supplementation which provided these two types of osmotic materials was accomplished by requiring subjects subsisting on carbohydrate to ingest NaCl or casein as a supplement. Thus, in the former case, osmotic excretion consisted primarily of electrolyte (NaCl, and in the latter of non-electrolyte (urea).

Quantitative augmentation of NaCl or casein in amounts which would provide a predictable rate of osmotic excretion was facilitated by scrutiny of the relationship between osmotic intake and osmotic excretion in the subjects of the summer (1955) and winter (1954) studies. It was found that osmotic intake was related to osmotic excretion in linear fashion, the coefficient of correlation being 0.95. Osmotic excretion was calculated from freezing-point depression measurements on urine, and osmotic intake was calculated as the sum of intake of Na, K, Cl, and N (assuming that all N ingested was converted to urea). Because of this quantitative relationship, the carbohydrate regimen was supplemented with 14.62 gm of NaCl (500 mEq) per day in one series of experiments, and with 125 gm of casein (20 gm N) per day (substituted isocalorically) in the other. These quantities of osmotic substances were expected to cause the rate of osmotic excretion to fall well above the region of inflexion of the sigmoid curve shown in Figure III.31 (Vol. I, p. 236), and thus simulate, in this respect, results of the previous investigation. (For additional background, the reader is referred to Vol. I, pp. 226-236.)

B. MATERIALS AND METHODS

1. Subjects and Periods of Study

This phase of the investigation was carried out at the University of Illinois during the interval from February 11, 1956, to April 13, 1956. This time interval was further subdivided into experimental periods as described below.

The subjects for the investigation were four adult males. All were judged to be in good health; none had demonstrable renal disease. The first series of experiments (A-I and A-II), in which the carbohydrate regimen was supplemented with NaCl, were carried out on R.A., aged 25, and F.S., aged 36. In those experiments in which the supplement consisted of protein (B-I and B-II), the subjects were C.M., aged 30, and D.D., aged 25.

A-I was carried out during the period from February 11, 1956, to February 28, 1956; A-II from March 14, 1956, to March 28, 1956; B-I from March 14, 1956, to March 27, 1956; B-II from April 1, 1956, to April 13, 1956. As shown in Tables AVII.1 and AVII.2, each experiment included three periods: an experimental period (EXP) which was preceded by a brief pre-period (PRE), and followed by a period of recovery (REC). In all periods, the subjects engaged in normal activities, which were largely sedentary, such as routine laboratory, classroom, or teaching duties.

TABLE AVII.1

PROTOCOL FOR EXPERIMENTS A-I and A-II

(Nutrient Regimen Comprising CHO or CHO with NaCl)

Experiment A-I			Experiment A-II		
Period and Day	Fluid Intake (ml/day)	Testing Procedure	Period and Day	Fluid Intake (ml/day)	Testing Procedure
PRE 1	ad lib.		PRE 1	ad lib.	
2	"	Blood Drawn; Water Diuresis Test	2	"	
			3	"	
EXP 1	2700		4	"	
2	"		5	"	Blood Drawn; Water Diuresis Test
3	"				
4	"	Two-hour Test			
5	900		EXP 1	900	
6	"		2	"	
7	"	Blood Drawn	3	"	
8	"		4	1000	Two-hour Test
9	1000	Two-hour Test	5	900	Two-hour Test; Blood Drawn; Water Diuresis Test
10	900				
11	"	Two-hour Test; Blood Drawn Water Diuresis Test	6	2700	
			7	2700	Blood Drawn

TABLE AVII.1 (Contd)

Experiment A-I			Experiment A-II		
Period and Day	Fluid Intake (ml/day)	Testing Procedure	Period and Day	Fluid Intake (ml/day)	Testing Procedure
REC 1	ad lib.		REC 1	ad lib.	
2	"		2	"	
3	"		3	"	Blood Drawn
4	"				
5	"	Blood Drawn			

TABLE AVII.2

PROTOCOL FOR EXPERIMENTS B-I and B-II

(Nutrient Regimen Comprising CHO or CHO with Casein)

Experiment B-I			Experiment B-II		
Period and Day	Fluid Intake (ml/day)	Testing Procedure	Period and Day	Fluid Intake (ml/day)	Testing Procedure
PRE 1	ad lib.		PRE 1	ad lib.	
2	"		2	"	
3	"		3	"	Blood Drawn; Water Diuresis Test
4	"	Blood Drawn; Water Diuresis Test			
EXP 1	900		EXP 1	2700	
2	"		2	"	
3	"		3	900	Blood Drawn
4	1000	Blood Drawn; Two-hour Test	4	"	
5	900		5	1000	Two-hour Test
6	ad lib.	Two-hour Test; Water Diuresis Test	6	900	Blood Drawn; Water Diuresis Test
7	ad lib.	Blood Drawn			
REC 1	ad lib.		REC 1	ad lib.	
2	"		2	"	
3	"	Blood Drawn	3	"	Blood Drawn

Quantitative collection was made of 24-hour specimens throughout each experiment.

In the PRE and REC periods, the subjects subsisted on their customary diets. During these periods, quantitative measurements included nude body weights (measured under standard conditions) and fluid intakes, in addition to urine and blood analyses described below. In the EXP periods, the subjects subsisted on one of three dietary regimens according to the experimental design. These regimens are the following:

Pure Carbohydrate (CHO). Subjects on this regimen subsisted throughout the EXP period on pure carbohydrate, supplied at the level of 2000 Cal/day. The most satisfactory form was found by experience to be 500 gm of jelly drops (Fred W. Amend Co., Danville, Ill.), although on occasion cane-sugar cubes were found to be more palatable, particularly when the subject became dehydrated.

Carbohydrate with NaCl (CHO with NaCl). When osmotic intake was augmented with NaCl, the regimen consisted of pure carbohydrate (as above), with the addition of 14.62 gm of NaCl (Reagent Grade, Baker Analyzed). The NaCl was ingested in crystalline form, and was expected to provide a urinary osmotic excretion of 500 mOsm/day or greater.

Carbohydrate with Protein (CHO with Protein). When osmotically active material for excretion was to be predominantly nitrogenous, subjects subsisted on a diet composed of 125 gm of casein (Borden's acid-washed, vitamin-free), 15 gm of gelatin (Baker Analyzed), and 360 gm of pure carbohydrate. Thus the total caloric intake was restricted to 2000 Cal/day. On this regimen, the subjects discovered by experience that the casein was most easily ingested when suspended in a concentrated gelatin solution which was subsequently allowed to solidify. Increased palatability was attained by addition of commercial food flavorings in quantities small enough not to contribute to caloric, electrolyte, or nitrogenous intakes.

In order to avoid complicating influences of hypovitaminosis, each subject was supplied with one vitamin capsule ("Kapseals-Combex with Vitamin C", Parke-Davis and Co.) daily.

During each EXP period, fluid intake consisted solely of distilled water. Coffee, tea or other beverages were excluded to avoid their diuretic effects, as well as to avoid the intake of unknown amounts of electrolyte or nitrogen. Dehydration of the subjects was accomplished by limitation of water intake to 900 ml/day. In two experiments, A-I and B-II, the period of restriction was preceded by a short period during which water intake was unrestricted; subjects were, in fact, urged to ingest more than 2700 ml/day. These brief periods of forced water intake served two purposes. First, they assured that the subjects were in water balance when the experiment began. Thus, the possibility of one subject becoming more dehydrated than another during the period of restriction due to a water deficit incurred prior to the experimental period was excluded. Further, it was considered that the diuresis resulting from forced water intake would promote

osmotic depletion in the subjects on the pure carbohydrate regimen. In experiments A-II and B-I, water restriction preceded forced water intake. This design was included to study further the importance of "washing-out" of solutes by forced diuresis in osmotic depletion.

The subjects were exposed to these regimens according to an experimental design which incorporated the cross-over technique. This technique is best illustrated by an example. In experiments A-I and A-II, the subjects were R.A. and F.S. In experiment A-I, R.A. subsisted on the carbohydrate plus NaCl regimen while F.S. subsisted on pure carbohydrate. Thus, the latter subject served as a control for the former. In experiment A-II, the subjects were reversed, i.e., R.A. subsisted on pure carbohydrate, while F.S. ingested carbohydrate with NaCl. Therefore, each subject acted as his own control by subsisting once on each regimen in the two experiments. Having employed this principle, we considered that adequate controls were incorporated to detect temporal, idiosyncratic, or non-specific responses to the regimens. Identical design was utilized in experiments B-I and B-II. The regimen of each subject in all experiments can be summarized as follows:

	Subject			
Experiment	R.A.	F.S.	C.M.	D.D.
A-I	CHO+NaCl	CHO	---	---
A-II	CHO	CHO+NaCl	---	---
B-I	---	---	CHO+Protein	CHO
B-II	---	---	CHO	CHO+Protein

2. Testing Procedures

In the course of the investigation, a variety of physiological and chemical techniques were employed. These include the following:

Water Diuresis Test. Water diuresis tests were performed twice on each subject during each experiment. The first test was administered on the last day of each PRE period; the second on the last day of water restriction during the EXP periods. Thus, the EXP tests were conducted at the time of maximum dehydration. This plan was followed irrespective of the position of the water-restriction periods in the experimental design.

The protocol used in this testing procedure has been described in Vol. I, Section II, of this report. One addition was made to the protocol. The volume of urine excreted by each subject during the remainder of the 24-hour period in which the test was conducted was measured and recorded. This measurement was made in order to detect delayed diuresis, if present. Urine excreted during the day of the water diuresis test was not saved for analyses.

During any single test, the two subjects involved in a particular experiment were tested simultaneously. Except in two instances, the tests were conducted from 7:00 a.m. to 12:00 noon. The two exceptions occurred during the EXP periods of experiments A-II and B-II. The changes in protocol were necessitated by the acute clinical deterioration and discomfort of the subjects on high osmotic regimens. In these two cases, all subjects involved were tested between 5:00 p.m. and 10:00 p.m.

Collection of Specimens. Each subject was required to collect quantitatively his 24-hour excretion of urine. The specimens were preserved with toluene during the collection period, at the end of which their volumes were measured and recorded. They were then diluted to the nearest liter with distilled water. Fifty-ml aliquots of the diluted specimens were placed in brown-glass bottles, capped, and stored in refrigerators for subsequent chemical analyses.

Blood Samples. Samples of blood were drawn at intervals throughout each experiment (Tables AVII.1 and AVII.2). Venipuncture regularly constituted part of the "two-hour test" (see below), but was also performed at other times. In all cases, subjects were post-absorptive (10-12 hrs) when blood was drawn. By venipuncture of the antecubital veins, 10-ml samples were drawn with minimal stasis. Serum was separated by allowing the blood to clot in clean, dry 15-ml centrifuge tubes, which were then centrifuged for 30 min at moderate speed. Serum was withdrawn by aspiration and was placed in clean, dry 15-ml specimen vials which were capped and frozen. The vials were then stored at -5°C at all times except while their contents were being removed for analyses. During any experiment, serum samples were placed in the freezer as they were collected, until all members of the series had been obtained. At this time, the samples were melted and their osmolarities determined (see below). Other chemical analyses were carried out after the osmolarity had been determined in order to prevent contamination which might affect this quantity.

The "Two-hour Test". On those days on which the "two-hour test" was conducted (Tables AVII.1 and AVII.2), the subjects reported in a post-absorptive state of 10-12 hours' duration. Upon their arrival at the test room, they emptied their bladders into appropriate collection containers, and drank 100 ml of water (tap water in PRE and REC periods, distilled in EXP periods). The latter procedure was necessary to insure the presence of sufficient urine in the bladder for voiding at the end of the test period. The subjects assumed a recumbent position, which was maintained until the end of two hours.

At the mid-point of the test period, a 10-ml sample of blood was drawn and the serum was separated as described above. A urine specimen was collected during recumbency over an accurately timed period, generally 110-120 minutes. The volume of this specimen was measured and recorded, and a 10-ml aliquot was used for an Addis count of the urinary sediments.

The Addis count comprises a method by which total excretion of urinary sediments can be measured semiquantitatively, and the presence and extent of

renal pathology can be determined. It was carried out according to the method described by Ham (1952). The procedure consists of centrifugation of the urine specimen at 2000 rpm for 10 min. The 1-ml portion containing the sediments after centrifugation and aspiration of supernatant is then mixed thoroughly, and is used to fill two hemocytometer chambers. When examined under low-power magnification the presence, character, and total numbers of casts, white blood cells, and red blood cells can be estimated. Further, the rate at which these elements were excreted could be calculated by application of appropriate factors for dilution and volume. In some cases, particularly in severely dehydrated subjects, large amounts of mucus prevented quantitative estimation of casts or blood cells. If this occurred, observations were made on uncentrifuged specimens.

3. Analytical Methods

Osmotic concentrations of all serum samples and all 24-hour urine specimens were determined with the Fiske Osmometer (Fiske Associates, Inc., Boston, Mass.). This instrument measures the freezing point electrically, by means of a special resistance-type thermistor thermometer in a Wheatstone bridge circuit. It is calibrated to read osmotic pressure units directly, on the basis that one milliosmol is equivalent to $0.00186^{\circ}C$. In every case, 2.0 ml aliquots were used in the determination.

The Na and K contents af all serum and 24-hour urine specimens were determined by flame photometry (Baird Associates, Inc., Cambridge, Mass.), with lithium as an internal standard. Appropriate dilutions were made by adding to 0.5-ml aliquots of urine or serum, 0.5 ml of 1.0 N $LiNO_3$ and 49.0 ml of 0.1 N HCl. Thus the final Li content was 10 mEq/L.

Several nitrogenous constituents in serum and urine were determined. Many of the methods used are described by Consolazio, Johnson and Marek (1951). Urea was determined in all serum samples and in the 24-hour urine specimens collected on the days prior to the venipunctures. The analytical method used was the urease method of Gentzkow and Masen (Consolazio, Johnson and Marek, 1951. p. 140). Creatinine in all urine specimens was determined by the alkaline picrate method of Folin and Wu (Consolazio, Johnson and Marek, 1951. p. 138). Serum creatinine was determined by the method of Haugen and Blegen (1953), in which creatinine is separated from pseudocreatinine material in serum by adsorption on Lloyd's reagent. It is then eluted with alkaline picrate, and determined spectrophotometrically. All serum samples were analyzed for non-protein nitrogen according to the method devised by Daly (Consolazio, Johnson and Marek, 1951. p. 135). The Keys micro-Kjeldahl method was used in determination of total nitrogen content of all 24-hour urine specimens (Consolazio, Johnson and Marek, 1951. p. 120).

Each of these methods was validated before use in routine analyses. The validation procedure consisted of determination of the reproducibility of results and efficiency of the method in recovering known quantities of the substance in question from each of the biological fluids analyzed.

Calculations. The above analyses having been carried out, the 24-hour excretion of osmotic material, Na, K, total N, and creatinine were calculated as the products of their concentration in urine (corrected for initial dilution) times the corresponding 24-hour urinary volumes.

Renal clearances of osmotic material, urea N, and creatinine were calculated by the standard clearance formula $C = UV/S$, where C is the clearance (ml/min); U is urinary concentration of the substance in question; V is the minute urinary volume; and S is the serum concentration of the substance, expressed in the same units as the urinary concentration.

Free-water clearances were calculated by the equation:

$$C_{H_2O} = C_{osm} - V$$

where C_{osm} is the osmotic clearance (ml/min), and V the minute urine volume (ml).

C. RESULTS AND INTERPRETATION

1. Osmotic Excretion

The mean rates of urinary excretion of osmotic material, Na, K, and total N are presented in Table AVII.3. Excretion rates of these substances during PRE periods are included for the purpose of demonstration of the effects of all EXP regimens. In the PRE periods, subjects subsisted on their customary diets and were presumably in nutrient and water balance. Under such conditions, the rate of excretion of each of the urinary constituents tabulated is closely correlated with intake. Thus variations in PRE values presumably only reflect variations in intake of each substance.

Of the four quantities measured in the PRE periods, total osmotic excretion showed the greatest tendency toward constancy in a given subject and among subjects. The mean value for all subjects in all PRE periods was 795 μOsm/min (1138 mOsm/24 hr); the range was 652 to 850 μOsm/min (889 to to 1224 mOsm/24 hr). However, when the subjects are considered individually, the range of variation for each becomes much smaller. It should be pointed out that all PRE period values for osmotic excretion were higher than the critical range (450-500 μOsm/min) described in a preceding section.

Partition of the osmotic materials contributing to the total osmotic excretion reveals that the mean fraction contributed by the major electrolytic constituents of urine was 53.2% (range 46.1 to 61.7%). In this calculation, it is assumed that the sum of 2(Na)+K excretion represents the major proportion of electrolytic excretion. The remainder of the total osmotic excretion presumably consists primarily of nitrogenous waste products, viz., urea. Thus, in PRE periods, osmols of electrolyte and nitrogenous substances contribute approximately equal fractions of the total osmotic excretion.

The relationship between osmotic intake and osmotic excretion is shown by the EXP results. In each subject, the experimental regimens caused the rate of osmotic excretion to be reduced below the mean PRE rates. However, the two types of EXP regimens are clearly segregated with respect to their effects on osmotic excretion. The one regimen common to all four subjects (CHO), consisting of the lowest osmotic intake, caused the most marked reduction in osmotic excretion. The mean rates for all subjects on CHO were 241 μOsm/min (range 212 to 266) or 347 mOsm/24 hr (range 305 to 383). The fraction of total osmotic excretion consisting of electrolytes was also markedly reduced (mean 24.9%), a result anticipated due to the salt-free nature of the regimen. Attention is called to the remarkable uniformity in the mean rates of Na excretion among the four subjects, when subsisting on the CHO regimen. The extreme range of mean values was 23 to 31 mEq/24 hr. Similar uniformity is seen in the mean rates of K excretion (range 30 to 40 mEq/24 hr). Thus, on the CHO regimen, the total osmotic excretion comprised predominantly nitrogenous osmols. Reference to Figure III.31 (Vol I, p. 236) reveals the position of these low rates of osmotic excretion in the sigmoid relationship between this quantity and the diuretic response to water.

TABLE AVII.3

URINARY EXCRETION OF OSMOTIC MATERIALS

(Summary)

Subject	EXP Regimen	Length of EXP Period	Period	Mean Daily Urinary Excretion: Osmotic		Na	K	Total N	Ratio of 2(Na)+K to Osmotic Excretion
		Days		mOsm/24 hrs	μOsm/min	mEq/24 hrs		gm/24 hrs	%
R.A.	CHO	7	PRE	1187	824	313	88	11.79	60.2
			EXP	330	229	23	34	5.78	24.5
	CHO with NaCl	10	PRE	1190	827	343	48	12.57	61.7
			EXP	650	451	233	34	4.18	73.7
F.S.	CHO	10	PRE	1215	844	265	57	16.14	52.6
			EXP	369	256	24	30	6.37	21.1
	CHO with NaCl	7	PRE	1128	783	217	89	15.23	46.4
			EXP	827	574	232	65	7.54	63.9
C.M.	CHO	6	PRE	1089	755	190	124	14.62	46.1
			EXP	305	212	23	40	4.73	27.9
	CHO with Casein	7	PRE	889	652	214	51	12.07	56.3
			EXP	938	617	28	72	19.51	11.4
D.D.	CHO	7	PRE	1182	821	243	74	16.53	47.4
			EXP	383	266	31	38	6.57	26.0
	CHO with Casein	6	PRE	1224	850	258	116	15.62	54.6
			EXP	904	691	34	48	19.56	12.9

TABLE AVII.4

DAILY URINARY EXCRETION OF OSMOTIC MATERIALS: SUBJECT R. A.

Experiment and EXP Regimen	Period and Day	Fluid Intake	Urine Volume (ml/24 hr)	Osmotic Excretion (mOsm/24 hr;	µOsm/min)	Electrolyte Excretion Na	K (mEq/24 hr)	2(Na)+K	Nitrogen Excretion Total N (gm/24 hr)	Urea N
A-1	PRE 1	U	1150	873	606	249	66	564	9.13	8.28
CHO	EXP 1	U	1530	625	434	107	49	263	8.87	
with	2	U	3200	889	617	266	51	583	7.74	
NaCl	3	U	2190	665	462	200	45	445	4.80	3.28
	4	U	1575	562	390	165	31	361	4.17	
	5	L	595	525	365	171	33	375	3.03	
	6	L	680	659	458	292	33	617	3.66	3.13
	7	L	700	702	488	310	32	652	4.01	
	8	L	500	520	361	180	20	380	3.23	2.25
	9	L	580	596	414	201	23	405	4.08	
	10	L	690	752	522	340	25	705	4.48	3.59
	REC 2	U	1850	912	633	165	11	341	14.02	
	3	U	1685	972	675	221	13	455	11.49	
	4	U	3095	1163	808	319	9	647	13.22	
	5	U	2890	1457	1012	445	40	930	12.86	
	6	U	2500	1268	881	358	38	754	13.08	11.00

TABLE AVII.4 (Contd)

DAILY URINARY EXCRETION OF OSMOTIC MATERIALS: SUBJECT R. A.

Experiment and EXP Regimen	Period and Day	Fluid Intake	Urine Volume (ml/24 hr)	Osmotic Excretion (mOsm/24 hr;	μOsm/min)	Electrolyte Excretion Na (mEq/24 hr)	K	2(Na)+K	Nitrogen Excretion Total N (gm/24 hr)	Urea N
A-II	PRE 1	U	2715	1396	969	396	106	898	13.25	
	2	U	2690	1144	795	283	92	658	11.25	
CHO	3	U	3135	1091	758	270	66	606	12.10	
	4	U	2840	1116	775	304	88	696	10.54	8.52
	EXP 1	L	860	458	318	43	90	176	7.49	
	2	L	550	284	197	24	32	80	4.54	
	3	L	470	283	197	17	28	62	5.35	4.56
	4	L	335	265	184	19	26	64	4.63	
	5	L	245	232	161	16	19	51	2.65	2.57
	6	U	1830	418	290	18	22	58	8.79	9.15
	7	U	2380	369	256	26	21	73	7.00	
	REC 1	U	705	475	330	63	24	150	8.48	
	2	U	1950	1047	727	271	57	599	12.15	
	3	U	1725	942	654	230	43	503	11.35	10.18

TABLE AVII.5

DAILY URINARY EXCRETION OF OSMOTIC MATERIALS: SUBJECT F. S.

Experiment and EXP Regimen	Period and Day	Fluid Intake	Urine Volume (ml/24 hr)	Osmotic Excretion (mOsm/24 hr;	µOsm/min)	Electrolyte Excretion Na	K (mEq/24 hr)	2(Na)+K	Nitrogen Excretion Total N	Urea N (gm/24 hr)
A-I	PRE 1	U	1670	1315	913	264	52	580	18.70	18.37
CHO	EXP 1	U	2710	683	474	84	60	228	9.46	
	2	U	2575	549	381	64	36	164	8.39	
	3	U	2310	476	331	58	37	153	8.48	5.08
	4	U	1785	374	260	11	32	54	6.55	
	5	L	355	244	169	2	31	35	3.71	
	6	L	375	301	209	3	28	34	5.51	4.58
	7	L	520	308	214	3	23	29	5.94	
	8	L	275	250	174	5	21	31	6.04	3.52
	9	L	405	272	189	6	15	27	5.38	
	10	L	265	234	163	3	16	22	4.21	3.52
	REC 2	U	805	624	433	55	20	130	12.53	
	3	U	920	831	577	113	15	241	15.58	
	4	U	1665	1002	696	188	8	384	16.90	
	5	U	1952	1138	790	253	31	537	14.41	
	6	U	2580	1406	976	356	87	799	14.55	12.90

TABLE AVII.5 (Contd)

DAILY URINARY EXCRETION OF OSMOTIC MATERIALS: SUBJECT F. S.

Experiment and EXP Regimen	Period and Day	Fluid Intake	Urine Volume (ml/24 hr)	Osmotic Excretion (mOsm/24 hr; µOsm/min)		Electrolyte Excretion (mEq/24 hr)			Nitrogen Excretion (gm/24 hr)	
						Na	K	2(Na)+K	Total N	Urea N
A-II	PRE 1	U	1340	1087	755	187	89	463	16.00	
	2	U	1980	1188	825	246	87	579	15.17	
	3	U	1015	955	663	169	79	417	12.73	
	4	U	2200	1281	890	267	99	633	17.03	18.70
CHO with NaCl	EXP 1	L	655	708	492	94	93	281	8.30	
	2	L	665	725	503	168	85	421	6.93	
	3	L	735	782	543	210	72	492	7.17	5.95
	4	L	810	830	576	263	64	590	6.82	
	5	L	1120	1085	753	401	65	867	7.99	6.60
	6	U	2000	844	586	220	38	478	9.16	7.60
	7	U	2800	812	564	266	37	569	6.44	
	REC 1	U	1545	1043	724	345	14	704	9.61	
	2	U	1295	1065	740	261	22	544	14.13	
	3	U	1410	1206	838	303	23	629	16.31	16.36

TABLE AVII.6

DAILY URINARY EXCRETION OF OSMOTIC MATERIALS: SUBJECT C. M.

Experiment and EXP Regimen	Period and Day	Fluid Intake	Urine Volume ml/24 hr	Osmotic Excretion (mOsm/24 hr	μOsm/min)	Electrolyte Excretion Na (mEq/24 hr)	K	2(Na)+K	Nitrogen Excretion Total N (gm/24 hr)	Urea N
B-I	PRE 1	U	1870	939	652	148	77	373	13.16	
	2	U	1655	872	606	322	72	716	12.28	
	3	U	1825	855	594	172	68	412	10.77	10.95
CHO with Casein	EXP 1	L	855	831	577	60	69	189	14.64	
	2	L	790	919	638	48	59	155	17.80	
	3	L	790	952	661	26	55	107	19.84	11.53
	4	L	750	877	609	12	49	73	18.54	
	5	L	840	941	654	10	47	67	20.87	20.76
	6	U	2390	1109	770	12	27	51	25.36	21.03
	REC 1	U	835	676	470	21	11	53	14.49	
	2	U	1515	656	456	58	11	127	13.97	
	3	U	1350	724	503	126	10	262	11.41	10.13
B-II	PRE 1	U	2560	1201	834	251	120	622	14.92	
	2	U	2270	972	675	129	127	385	14.32	14.30
CHO	EXP 1	U	2720	514	357	41	66	148	7.62	
	2	U	2365	329	229	33	57	123	4.33	5.20
	3	L	700	254	176	16	34	66	3.82	
	4	L	730	269	187	16	32	64	4.57	3.94
	5	L	450	242	168	17	24	58	4.21	
	6	L	300	223	155	12	27	51	3.85	3.99
	REC 1	U	1000	515	357	85	15	185	9.74	
	2	U	1645	719	499	143	20	306	9.99	11.35
	3	U	2090	884	614	228	44	500	11.10	

TABLE AVII.7

DAILY URINARY EXCRETION OF OSMOTIC MATERIALS: SUBJECT D. D.

Experiment and EXP Regimen	Period and Day	Fluid Intake	Urine Volume (ml/24 hr)	Osmotic Excretion (mOsm/24 hr;	µOsm/min)	Electrolyte Excretion Na	K (mEq/24 hr)	2(Na)+K	Nitrogen Excretion Total N	Urea N (gm/24 hr)
B-I	PRE 1	U	1850	1099	763	220	67	507	15.30	
	2	U	1040	1089	756	183	79	445	15.91	
	3	U	1550	1358	943	326	75	727	18.40	17.36
CHO	EXP 1	L	925	700	486	104	56	264	10.87	
	2	L	400	373	259	32	44	108	6.15	
	3	L	315	315	219	19	33	71	5.51	6.90
	4	L	305	313	217	11	36	58	5.72	
	5	L	275	301	209	9	34	52	5.58	5.20
	6	U	1275	293	203	13	22	48	5.52	6.12
	REC 1	U	520	470	326	27	19	73	9.82	
	2	U	915	878	610	204	30	438	13.56	
	3	U	1780	1244	864	408	43	859	14.11	14.10
B-II	PRE 1	U	1240	1266	879	291	131	713	15.11	
	2	U	1395	1182	821	225	101	551	16.13	16.88
CHO with Casein	EXP 1	U	1560	1089	756	100	69	269	19.81	
	2	U	1190	1089	756	41	57	139	22.56	25.23
	3	L	835	1016	706	30	40	100	22.41	
	4	L	740	980	681	16	40	72	20.92	22.79
	5	L	690	984	683	13	47	73	13.98	
	6	L	550	808	561	6	34	46	17.68	20.13
	REC 1	U	760	835	580	6	21	33	16.64	
	2	U	1400	979	680	193	27	271	17.47	22.82
	3	U	1840	1242	863	401	35	739	13.87	

In experiments A-I and A-II, in which the osmotic intake was augmented with NaCl, the rates of osmotic excretion were correspondingly increased. Thus R.A., who excreted 229 μOsm/min (330 mOsm/24 hr) while subsisting on CHO, exhibited an excretion rate of 451 μOsm/min (650 mOsm/24 hr) when he ingested NaCl. F.S. responded similarly, excreting 256 μOsm/min (369 mOsm/24 hr) on CHO and 574 μOsm/min (827 mOsm/24 hr) on CHO with NaCl. The discrepancy between rates in the two subjects on the higher osmotic regimen can be explained on the basis of individual differences in rate of endogenous nitrogen metabolism, for the mean rate of Na excretion in the two subjects was identical. The higher rate of N excretion by F.S. (7.54 gm/24 hr) than by R.A. (4.18 gm/24 hr) supports this explanation. Similarly, the higher rate of K excretion by the former subject indicates that tissue catabolism proceeded more extensively than in R.A. Irrespective of this discrepancy, in both subjects that fraction of the osmotic load contributed by electrolytic osmols (R.A., 73.7%; F.S., 63.9%) was predominant over the fraction contributed by nitrogenous osmols.

An even greater effect on osmotic load was noted in experiments B-1 and B-II, where supplementation was accomplished with casein. In contrast to the osmotic excretion on CHO, 212 μOsm/min (305 mOsm/24 hr), C.M. on casein supplement excreted 617 μOsm/min (938 mOsm/24 hr). On the same two EXP regimens, D.D. exhibited osmotic loads of 266 μOsm/min (383 mOsm/24 hr) and 691 μOsm/min (904 mOsm/24 hr) respectively. The paramount position of nitrogenous osmols in both casein experiments is illustrated by the relatively minor portion of osmotic load contributed by electrolytes in these two experiments (C.M., 11.4%; D.D., 12.9%).

Two observations of striking uniformities can be made from a consideration of the mean data presented in Table AVII.3. In those experiments in which osmotic supplement was provided as NaCl, both subjects ingested 250 mEq of Na daily. Both subjects excreted this ion in practically identical quantities, i.e., the mean daily excretions were 233 mEq by R.A., and 232 mEq by F.S. Similar uniformity occurred in excretion of N by the two subjects in the casein experiments. Both subjects received 20.0 gms N daily, and their mean excretions of total N were 19.51 gm/24 hr (C.M.) and 19.56 gm/24 hr (D.D.) respectively. Thus, N-balance was maintained in both subjects.

Although certain uniformities are exhibited by the mean values presented above, examination of data of individual subjects permits more thorough evaluation of responses to the EXP regimens. In order to facilitate interpretation, the daily excretion values for each subject and each experiment have been tabulated (Tables AVII.4 - AVII.7). Data appearing in these tables have been derived from original analytical data which are recorded in Tables AVII.13 - AVII.16.

With respect to urinary excretion of electrolytes, the responses of all subjects to regimens which did not include NaCl (CHO and CHO with casein) were practically identical. The average data presented above fail to illustrate several chronological events which characterized these responses. The efficiency of the sodium-conservation mechanism is illustrated by the

daily excretion rate of this ion when the subjects were placed on any sodium-free regimen. Characteristically, the rate of Na excretion was sharply reduced on the first day of the regimen. However, that this reduction did not represent a maximum is shown by subsequent further reductions which uniformly continued until the subjects were excreting essentially sodium-free urine. In every case, subjects on CHO or CHO with casein regimens excreted less than 18 mEq Na per day after the sixth day. A similar response to low-salt regimens has been noted by many others, e.g., Stanbury and Thomson (1951). In fact, it is so characteristic in the absence of adrenocortical dysfunction, that Black (1953) has concluded that production of even moderate sodium deficiency by restriction of sodium intake alone is impossible except in very prolonged experiments.

Analagous, but not identical, results were obtained in the case of nitrogen excretion on those regimens (CHO and CHO with NaCl) which contained no dietary nitrogen. Urinary nitrogen excretion decreased, but did not reach a minimum, immediately following removal of protein from the diet. Rather it diminished gradually for several days, successive decrements becoming smaller. Smith (1926) has shown that this regression continues for at least 24 days, perhaps longer. Peters and Van Slyke (1946) interpret these events in terms of changes in rate of endogenous protein catabolism. In their opinion, a minor part of the excess nitrogen excreted during the first several days must come from pre-formed NPN which is swept from tissues and blood. The magnitude of this component, however, is too small to account for the difference in nitrogen excretion between the early and late portions of such an experiment. Rather, it is thought that the rate of protein catabolism itself diminishes as the experiment progresses. In the present experiments, although urinary nitrogen decreased during EXP periods, the decrements were not uniform. Small daily variations were noted, the significance of which will be mentioned subsequently.

In contrast to the uniformity of sodium excretion on low sodium regimens, subjects who received NaCl (R.A. and F.S.) during an EXP period demonstrated extreme variability in this respect. Although the mean rates of sodium excretion for the entire EXP periods were practically identical (see above) for both subjects, each showed large daily fluctuations. The extreme range for Na excretion for R.A. was 107 to 340 mEq/24 hr, and for F.S. was 94 to 401 mEq/24 hr. It will be recalled that both subjects ingested 250 mEq/24 hr daily during the EXP periods. The large daily fluctuations can probably be attributed to the manner in which the salt was ingested. Although the subjects were urged to distribute the daily salt ration into several small portions, this practice was not always followed, especially during water restriction periods. If a large portion of salt were ingested at one time, it is probable that the renal reabsorptive capacity would be exceeded. As a result, sodium excretion would rise.

A similar sequence of events obtained with respect to nitrogen excretion by subjects C.M. and D.D. on the CHO with casein regimen. Although each subject received 20 gm of N daily, the rates of excretion varied from 14.64 to 25.36 gm of N/24 hr (C.M.) and 13.98 to 22.56 gm of N/24 hr (D.D.). Two correlates can be made with this variability. One is the manner in which

the protein was ingested as described for sodium above. The second relates nitrogen excretion to water intake and, therefore, to urine volume. In both subjects, the daily excretion of nitrogen was much higher when water was unlimited and urine volume large than during periods of water restriction.

Since total osmotic excretion is determined predominantly by the excretion of sodium and nitrogen (urea), it is obvious that fluctuations in this quantity would parallel the rates of excretion of the latter substances. This, in fact, was the case in every experiment. Daily fluctuations in the excretion of electrolytes and nitrogen were reflected in concurrent changes in osmotic excretion. Furthermore, without exception, urine volumes underwent parallel variations. Water restriction was the prominent feature of each experiment. Under this restriction, urine volume is rapidly reduced to its minimum (obligatory) volume in an effort to conserve water. The magnitude of the obligatory volume is determined by the total osmotic substances demanding excretion (Smith, 1956). Thus, intake of large quantities of salt or protein at one time may have caused slight osmotic diuresis, thereby increasing the volume of urine excreted.

Data concerning osmotic excretion during periods of unrestricted or forced fluid intake are insufficient to justify generalization. However, a trend was noted for osmotic excretions to be higher when urine volumes were increased by unlimited water intake. This trend is particularly evident in subjects on higher osmotic regimens. Frey and Schirmeister (1954) have shown that besides producing a water diuresis, ingestion of large volumes of water causes a concomitant increase in the rate of excretion of NaCl, which is reflected in an increase in osmotic clearance. The parallel increase in NaCl excretion is termed a "grafted osmotic diuresis." This finding may explain the mechanism by which subjects on low osmotic regimens and unlimited water reach the state of salt-depletion (osmotic-depletion) dehydration shown in Figure III.31 (Vol I., p. 236).

2. Water Deficit and Water Diuresis

In order to illustrate in comparative fashion the degree of dehydration provoked by each of the EXP regimens, virtual water balances were calculated for each subject during each period of water restriction. These balances were calculated according to the standard balance equation, i.e.:

$$\text{Water Balance} = \text{Fluid Intake (ml/day)} - \text{Fluid Loss (ml/day)}$$

Fluid intake was computed as (ingested water + preformed water in nutrients + metabolic water). In calculation of metabolic water, it was assumed that oxidation of CHO resulted in 0.6 ml/gm, while metabolic water from protein amounted to 0.41 ml/gm. Fluid loss was also estimated from several sources, some of which were measured, others calculated. Total fluid loss was calculated as urine volume + insensible water loss. The latter source of fluid loss, according to Sargent et al. (1954) is related to body weight, and cannot be expressed by an arbitrary value (e.g. 1000 ml/day) as alleged by others (Gamble, 1947). Consequently, insensible water loss was computed as 0.66 ml/kg/hr.

It is obvious that water balances calculated in this fashion are virtual, not absolute. Furthermore, since no attempt was made to estimate sweat loss or water loss through feces, water deficits calculated on the basis of these virtual balances represent minimum values. Thus losses through feces and sweat not accounted for in the balance calculation could only increase the degree of dehydration.

The data regarding dehydration produced in each EXP period by restriction of water are presented in Table AVII.8. The calculated net water deficits range from 1.07 liters (after four days of water restriction) to 4.38 liters (after five days of water restriction). An obvious relationship exists between the osmotic content of the EXP regimen and degree of dehydration. In every case, the higher osmotic regimen was correlated with more severe dehydration. Correlation results from the elevated urine volumes required to excrete osmotic material.

TABLE AVII.8

CALCULATED WATER DEFICIT AND WATER DIURESIS: SUMMARY

Subject	EXP Regimen	Length of Water Restriction Period (Days)	Calculated Water Deficit (Liters)	Mean EXP Osm. Excretion (μOsm/min.)	Water Diuresis Test Net % Recovery PRE	Water Diuresis Test Net % Recovery EXP
R.A.	CHO	5	1.84	229	93.0	89.0
	CHO with NaCL	6	2.12	451	78.0	9.6
F.S.	CHO	6	2.38	256	113.0	56.2
	CHO with NaCl	5	4.38	574	118.0	0.0
C.M.	CHO	4	1.07	212	97.9	65.4
	CHO with Casein	5	2.39	617	90.0	5.3
D.D.	CHO	5	1.25	266	74.0	23.6
	CHO with Casein	4	2.54	691	102.0	0.0

Also presented in Table AVII.8 are the results of water diuresis tests conducted at the end of each PRE period and after water restriction in the EXP periods. The mean recovery of the oral load in all subjects in all PRE

periods was 95.7%. In six of the eight PRE period tests, this value exceeded 90%; in three cases, more than 100% of the load was excreted. Sargent et al. (1955) have pointed out that healthy men in nutrient and presumed water balance regularly excrete more than 50% of the load. In EXP tests, the diuretic responses to water were clearly correlated with the EXP rates of osmotic excretion. On the low osmotic regimen (CHO), the four subjects responded to the water diuresis test with a mean recovery of 58.6%. When osmotic load was high, the mean value was 3.7%.

Observations made on the basis of mean values are supported by consideration of data from individual experiments. When a subject's response on the low osmotic regimen is compared with that on the high osmotic regimen, Table AVII.8, in all instances diuresis was much more pronounced in the former. After subsisting on NaCl or casein-supplemented regimens, diuresis was absent in two instances (0% recovery), and was reduced sharply (recovery less than 10%) in the other two cases. Quantitative collection of urine for 18 hours following the water tolerance test failed to reveal delayed diuresis which characteristically appears in uncontrolled Addisonians. When the water load was retained, the retention was permanent.

One aberrant result was obtained on the CHO regimen. In the case of subject D.D., whose mean osmotic load on this regimen was 266 μosm/min, the water diuresis test resulted in a recovery of only 23.6%. According to the theoretical concepts discussed above and presented in Figure III.31 (Vol. I, p. 236), a subject whose osmotic excretion was of this magnitude should respond to the oral water load with a diuresis greater than 50% recovery. Several explanations may be proposed for this aberrant response. Sargent et al (1955) have reported similar cases which appear to have been idiosyncratic in nature. In the present experiment (B-I), the period of water restriction was not preceded by a period of forced water intake. Thus, osmotic depletion may not have been accomplished in this subject, particularly if his homeostatic mechanisms for prevention of this phenomenon were more efficient than those of other subjects. This discrepancy is not considered to jeopardize generalizations based upon the other results, particularly since the same subject showed a complete absence of diuresis after exposure to the high osmotic regimen. In the latter instance, the PRE period recovery was 102%, whereas the EXP test resulted in 0% recovery.

Several general conclusions seem justifiable from the above results. First, it is shown that the mathematical relationship between osmotic load and water diuresis expressed in Figure III.31 (Vol. I, p. 236) is reproducible, particularly at the extremes of the osmotic excretion range. Further, the cross-over technique utilized in all experiments excludes the possibility that differentiation of diuretic effects of water under the conditions of the experiments is a function of chronological or idiosyncratic phenomena. Comparison of the results of experiments A-I and II (NaCl) and B-I and II (casein) reveals that the antidiuretic capacity of a high osmotic regimen does not depend upon the nature of the osmotic material being excreted. Diuresis was inhibited as effectively when NaCl constituted the major portion of the osmotic load as when this portion was urea. It appears that renal water reabsorption is conditioned by the osmotic content

of urine (or by some factor related to this parameter), and that the osmotic effect of electrolyte (NaCl is indistinguishable from that of non-electrolyte (urea). Thus, in this respect, an osmol is an osmol regardless of the nature of the contributing particles.

3. Renal Function

In order to study renal function in a more direct manner during the EXP periods, several standard renal clearances were calculated at intervals in the course of each experiment. These included creatinine, urea, osmotic, and free-water clearances, each of which was calculated on an endogenous, 24-hour basis. The results of these calculations are presented in Tables AVII.9 and AVII.10, and the EXP period changes from PRE values are shown graphically in Figures AVII.1 and AVII.2.

Endogenous 24-hour creatinine clearance has been considered to be an accurate measure of glomerular filtration rate. This parameter of renal function was studied on each subject in all experiments except A-I. Inspection of Figures AVII.1 and AVII.2 reveals changes provoked by the experimental regimens. It is noted that on high osmotic regimens, creatinine clearance was maintained within 75% of the PRE value in two cases, and was increased sharply in one subject (C.M.). Limitation of water had little apparent influence on these changes. On the low osmotic regimen (CHO), creatinine clearance was depressed to less than 50% of its PRE value in two cases, but was sharply increased in another (D.D.). Limitation of water had an inconsistent effect, resulting in a depression of the clearance in one subject (R.A.), and an increase in a second (D.D.). When absolute values are examined (Tables AVII.9 and AVII.10), it is seen that customary diets (REC) uniformly returned the glomerular filtration rate to values comparable (in some cases identical) to the PRE period levels. Sargent and Johnson (1956) report similar changes in creatinine clearances to be the result of caloric deficit regardless of the source of calories.

Historically, clearance of urea has been most thoroughly studied of all renal function tests. Smith (1951) and Peters and Van Slyke (1946) review the history of knowledge concerning this test of renal function as well as known physiological factors which cause modifications thereof. It has long been known that urea clearance at moderate to high rates of urine flow (2 ml/min) closely parallels clearance of creatinine on inulin. Therefore, the "maximum urea clearance" of Van Slyke has been used as a measure of glomerular filtration. However, at lower rates of urine formation, urea clearance becomes related quadratically to the rate of urinary excretion. Since, in the present experiments, water restriction was a prominent feature, urine flow during the EXP periods exceeded 1 ml/min only during short periods when water intakes were large. Consequently, changes observed in urea clearance are presumed only to reflect changes in urinary volume.

Data presented in Figures AVII.1 and AVII.2 demonstrate graphically the marked and uniform effects of dehydration on urea clearances. Regardless of the osmotic nature of the regimens, limitation of water resulted in progressive decreases in urea clearance. In those experiments in which

TABLE AVII.9

RENAL CLEARANCE: SUBJECTS R.A. AND F.S.

Subject	Experiment and EXP Regimen	Period and Day	Fluid Intake	Renal Clearance (ml/min) Osmotic	Creatinine	Urea	Free-Water
R.A.	A-I CHO with NaCl	PRE 1	U	2.02		41.2	-1.22
		EXP 3	U	1.58		38.0	-0.06
		" 6	L	1.44		21.8	-0.97
		" 8	L	1.19		10.4	-0.84
		" 10	L	1.59		32.1	-1.11
R.A.	A-II CHO	PRE 4	U	2.66	101.5	64.2	-0.69
		EXP 3	L	0.67	47.2	27.6	-0.34
		" 5	L	0.50	101.5	17.8	-0.33
		" 6	U	0.17	97.7	60.6	+1.10
		REC 3	U	2.16	111.2	69.4	-0.96
F.S.	A-I CHO	PRE 1	U	2.70		74.4	-1.55
		EXP 3	U	1.10		46.3	+0.50
		" 6	L	0.67		27.6	-0.41
		" 8	L	0.56		21.1	-0.37
		" 10	L	0.51		22.4	-0.33
F.S.	A-II CHO with NaCl	PRE 4	U		165.0	73.1	
		EXP 3	L	1.70	129.4	21.5	-1.19
		" 5	L	2.16	137.7	27.9	-1.38
		" 6	U	1.89	124.2	70.0	-0.51
		REC 3	U	2.70	113.5	60.9	-1.72

TABLE AVII.10

RENAL CLEARANCE: SUBJECTS C.M. AND D.D.

Subject	Experiment and EXP Regimen	Period and Day	Fluid Intake	Renal Clearance (ml/min) Osmotic	Creatinine	Urea	Free-Water
C.M.	B-I	PRE 3	U	1.98	106.3	42.6	-0.71
	CHO with	EXP 3	L	2.24	160.9	26.9	-1.69
	Casein	" 5	L	2.02	130.1	54.1	-1.44
		" 6	U	2.37	121.8	47.1	-0.71
		REC 3	U	1.67	108.1	56.4	-0.73
C.M.	B-II	PRE 2	U	2.21	338.2	73.0	-0.63
	CHO	EXP 2	U	0.75	112.7	65.6	+0.89
		" 4	L	0.59	109.6	23.5	-0.08
		6	L	0.52	113.5	26.6	-0.31
		REC 2	U	2.07	340.0	75.8	-0.62
D.D.	B-I	PRE 3	U	3.19	172.0	56.3	-2.11
	CHO	EXP 3	L	0.75	266.0	48.2	-0.53
		" 5	L	0.68	100.0	21.4	-0.49
		" 6	U	0.67	---	---	+0.22
		REC 3	U	2.95	171.3	109.1	-1.71
D.D.	B-II	PRE 2	U	2.62	161.2	100.1	-1.65
	CHO with	EXP 2	U	2.51	140.9	93.0	-1.68
	Casein	" 4	L	2.05	129.8	70.7	-1.54
		" 6	L	1.74	142.5	56.8	-1.36
		REC 2	U	2.25	187.2	118.6	-1.28

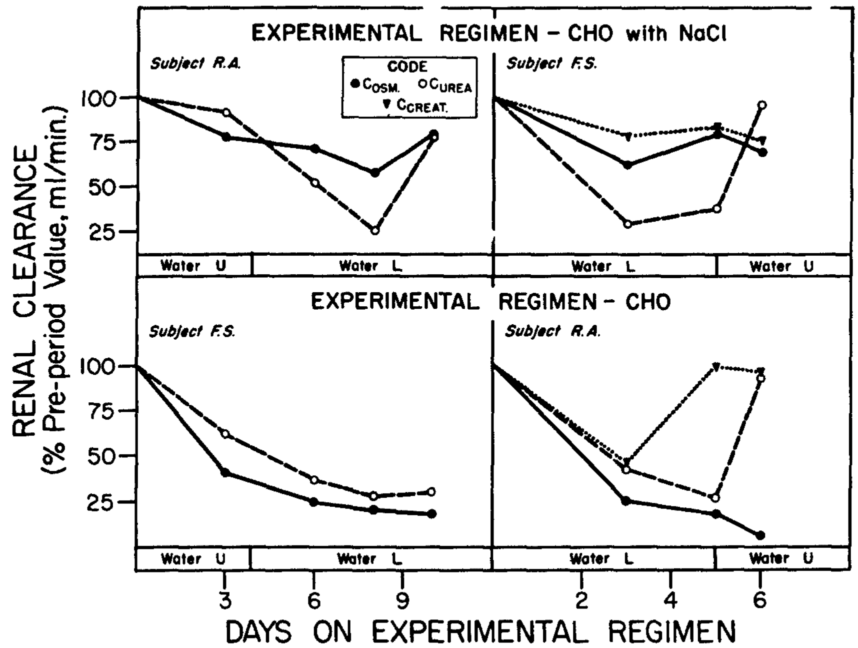

FIGURE AVII.1. RENAL CLEARANCES DURING EXP PERIODS: EXPERIMENTS A-I AND A-II.

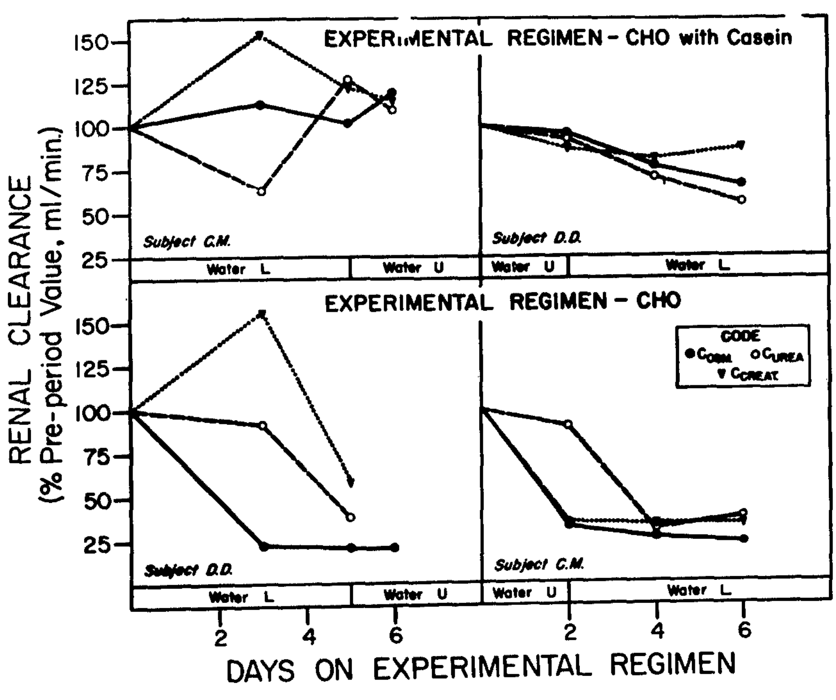

FIGURE AVII.2. RENAL CLEARANCES DURING EXP PERIODS: EXPERIMENTS B-I AND B-II.

water was not restricted during the first several days, urea clearance was maintained within 80% of the PRE period value. During subsequent periods of water restriction, these values were reduced progressively. In most cases, at the end of the period of water restriction, urea clearances were reduced to 25-30% of the PRE values. Conversely, in every case where water restriction preceded periods of unlimited water, increased water intake without change in the nutrient regimen restored the clearances to their PRE values or higher. Although, as stated above, these changes are presumed to be due only to variations in urinary volume, many other investigators, including McCance and Widdowson (1937) have reported similar depression by low-protein, sodium-deficient diets.

If the mathematical concept of clearance is applied to total osmotically active substances (i.e., osmotic clearance), numerical values for the clearance become autocorrelated with osmotic intake. Thus, a subject subsisting on a very low osmotic regimen (CHO) would show a decrease in osmotic clearance since urinary osmotic excretion is extremely low. However, Frey, Schirmeister, and Henning (1954) have reported that osmotic clearance in men whose osmotic excretion was moderately high is related to urine volume in a manner quite analogous to urea clearance. At rates of urine excretion below 0.84 ml/min (the "augmentation limit"), osmotic clearance becomes related quadratically to the minute urine volume.

Interpretation of results of the present experiments incorporates both of these concepts. The CHO regimen resulted in progressive decreases in osmotic clearance in all subjects. At the end of the EXP periods, the clearance value for each subject had been reduced to less than 20% of the normal (PRE) for that subject. Unlimited water early in the EXP period had a tendency to retard the depression, but failed to increase the osmotic clearance when given at the end of the period.

High osmotic regimens, on the other hand, resulted in a less marked depression in osmotic clearance. Whether the osmols being excreted were electrolyte or urea, osmotic clearance never decreased to less than 65% of the PRE value; in fact this clearance was increased in one subject (C.M.). In these regimens, unlimited water tended to protect osmotic clearance if given at the beginning of the EXP period and to increase it if given following water restriction. Fluctuations during the periods of water limitation are probably related to variations in urine volume (Frey et al., 1954).

These results concerning renal clearances fail to yield information which might form a basis for explanation of the sharp segregation of responses to the water tolerance test. It appears that the inability of the kidney to retain water in an osmotically-depleted subject is not related to alteration in functions which are estimated by the clearance techniques used above.

4. Serum Osmolarity and Constituents

Alterations in the serum contents of Na, K, NPN, urea N, creatinine, and in total osmotic concentration caused by the experimental regimens are presented in Tables XXVI, and XXVII, and in Figure VI. Since the changes in serum osmolarity are of primary interest as related to the water diuresis

responses, the results will be discussed with emphasis on this variable.

Although the data presented are not quantitatively sufficient for statistical validation, several general observations may be made. In each experiment, limitation of water resulted in increases in serum osmolarity in all subjects, regardless of the osmotic composition of regimen. However, subjects on high osmotic regimens uniformly demonstrated a more marked increase than those on CHO alone. Conversely, intake of large quantities of water caused a depression in serum osmolarity. Return to customary diet (REC) in every experiment except A-I resulted in a return of serum osmolarity to values approximately the PRE values, which also were within the "normal" range reported by Smith (1951), and by Lifson (1944). The exceptional case (A-I) will be discussed subsequently,

Consideration of data of individual experiments reveals more variability in response. In experiments A-II and B-I (Figure VI), limitation of water preceded unrestricted intake. The efficiency of mechanisms for maintenance of internal constancy in osmotic pressure is demonstrated by three of the four subjects involved. For the first four days of water restriction, in the three cases mentioned, serum osmolarity was maintained within 4 mOsm/L of the PRE value. In the fourth subject (F.S.), there was an increase of 19 mOsm/L (290 to 309 mOsm/L) in four days. In all four subjects, there occurred a sharp increase in osmolarity on the fifth day. Introduction of unrestricted water intake brought about a marked decrease in serum osmolarity in two subjects (Exp. A-I); its effect was not studied in the others.

Data presented in Tables AVII.11 and AVII.12 reveal that the relatively slight variations in serum osmolarity during the first four days of these experiments can be accounted for by variations in Na, K, and urea concentrations; the latter parallel variations in the former. However, increases in these osmols are not quantitatively related to the sharp increases on the fifth and sixth days, although they are parallel in direction.

Results in experiments A-I and B-II are even more variable. In the former experiment, PRE values for serum osmolarity were higher than similar values in any other experiment; they were, in fact, well above the "normal range" of Smith (1951). Contributing osmols (Na, K, and urea) were also moderately elevated, although still within accepted "normal limits". During the EXP period, unrestricted water intake resulted in a very marked decrease in serum osmolarity in both subjects. These results suggest that the two men were moderately dehydrated at the time blood was drawn. A similar decrease, though slight in comparison, in serum osmolarity resulting from unlimited water intake was noted in the subjects in experiment B-II.

Imposition of water restriction in both experiments brought about an increase in serum osmolarity in all subjects. However, after the third day of water restriction, serum osmolarity decreased sharply in each subject although there was no increase in fluid intake. The decreases ranged in magnitude from 6 mOsm/L in one subject (F.S.) to 23 mOsm/L in another (C.M.), and occurred in the face of unchanged or even slightly increased serum con-

TABLE AVII.11

SERUM OSMOLARITY AND CONSTITUENTS: SUBJECTS R.A. AND F.S.

Experiment	Period and Day	Osmolarity mOsm/L	Na mEq/L	K mEq/L	NPN mg%	Urea N mg%	Creatinine mg%
			Subject R.A.				
			Experimental Regimen: CHO with NaCl				
A-1	PRE 2	318	151	4.8	29.0	14.0	
	EXP 4	282	141	3.5	18.0	6.0	
	" 7	307	141	3.7	24.0	9.9	
	" 9	294	141	3.7	25.0	15.2	
	" 10	318	152	3.9	27.0	7.8	
	REC 6	287	141	4.5	26.0	14.5	1.13
			Experimental Regimen: CHO				
A-II	PRE 4	281	139	4.8	23.0	9.2	1.36
	EXP 4	286	145	4.4	28.6	11.6	1.06
	" 5	310	155	4.7	28.8	14.8	1.31
	" 7	291	150	5.1	24.5	10.7	1.30
	REC 3	293	150	4.4	25.5	10.2	1.25
			Subject F.S.				
			Experimental Regimen: CHO				
A-I	PRE 2	324	152	4.7	38.0	17.0	
	EXP 4	285	139	3.7	26.0	7.6	
	" 7	301	141	4.1	24.5	11.5	
	" 9	295	142	4.1	30.2	11.5	
	" 10	302	148	3.4	27.6	10.7	
	REC 6	301	150	5.2	34.5	16.5	
			Experimental Regimen: CHO with NaCl				
A-II	PRE 4				34.5*	17.8	1.03
	EXP 4	309	154	3.9	29.4	19.2	1.09
	" 5	340**	172	4.6	28.8	16.5	1.22
	" 7	299	150	4.3	19.5	7.5	0.99
	REC 3	301	151	5.0	36.0	19.3	1.19

* Hemolyzed

** Non-fasting blood

TABLE AVII.12

SERUM OSMOLARITY AND CONSTITUENTS: SUBJECTS C.M. AND D.D.

Experiment	Period and Day	Osmolarity mOsm/L	Na mEq/L	K mEq/L	NPN mg%	Urea N mg%	Creatinine mg%
			Subject C.M.				
		Experimental Regimen: CHO with Casein					
B-I	PRE 3	283	143	4.9	23.0	17.9	0.96
	EXP 4	286	145	4.7	34.5	29.8	0.64
	" 5	311	153	4.2	43.0	29.8	0.83
	" 6	315	155	4.7	47.0	31.0	1.01
	REC 3	291	149	4.9	31.0	12.5	0.99
		Experimental Regimen: CHO					
B-II	PRE 2	295	150	4.8	27.7	15.8	0.34
	EXP 3	292	147	4.0	22.0	5.5	0.87
	" 5	311	159	4.8	23.5	11.7	0.94
	" 6	288	148	4.0	22.5	10.5	0.89
	REC 3	296	150	4.4	25.7	13.2	0.90
			Subject D.D.				
		Experimental Regimen: CHO					
B-I	PRE 3	287	142	5.6	25.4	21.5	0.82
	EXP 4	285	145	5.0	25.0	10.0	0.48
	" 5	297	153	5.3	27.8	16.8	1.29
	" 6	298	---*	---	--	--	--
	REC 3	284	145	5.4	28.8	9.2	0.87
		Experimental Regimen: CHO with Casein					
B-II	PRE 2	304	155	5.3	27.0	14.5	0.98
	EXP 3	293	148	4.0	33.5	18.9	0.93
	" 5	320	162	4.4	44.2	22.2	0.94
	" 6	310	159	3.9	33.7	24.5	0.87
	REC 3	291	150	4.1	25.6	13.3	0.78
	" 5	308	162	5.6	25.3	14.0	0.65

* Hemolyzed

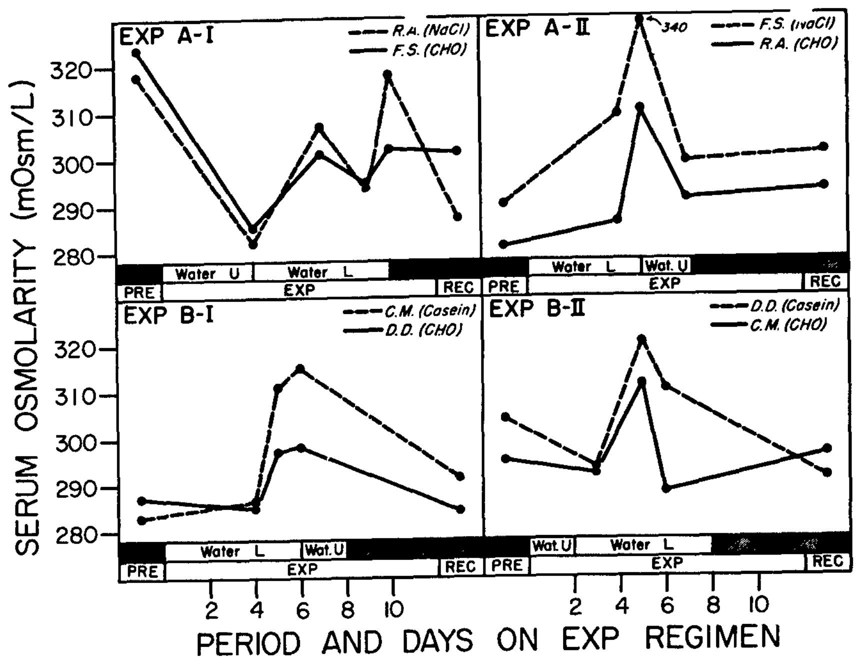

FIGURE AVII.3. SERUM OSMOLARITY: SUMMARY

centration of Na, K, and urea. The changes are thus not explained by concomitant variations in the osmotic particles determined analytically.

Black (1945) has reported similar increases in serum osmolarity in water-deprivation dehydration. In salt-depletion dehydration, however, decreased serum osmolarity was observed. A feature common to both types of fluid depletion was an increase in serum NPN and urea. These observations are interpreted in terms of internal shifts of fluid from intracellular to extracellular compartments.

Interpretation of present results becomes more complex. Two opposing tendencies exist as a result of the nutrient regimens. The salt- (ion) free nature of the CHO regimen tends to depress serum osmolarity by promoting sodium depletion. However, the limitation of water imposed simultaneously caused an increase by enhancing hemoconcentration. The results indicate that the latter was the more influential of the two tendencies. Addition of osmotic substances to the regimens merely intensified the response, since, without exception, changes were parallel in both subjects in a given experiment (Figure AVII.3).

Elucidation of causes of increases in serum osmolarity is not provided by scrutiny of analytical data on composition; increased osmolarity occurred in the face of decreases in the osmotic substances reported (see above). Several possible explanations for these opposite changes exist. Since electrolytes comprise the major portion of osmols contributing to serum osmolarity, it is possible that fluctuations in some ion not determined analytically (e.g., Cl) could have resulted in the changes. However, none of the literature reviewed reported such changes. Similarly, alteration in colloid osmotic pressure of serum proteins could have explained the discrepancies. However, this fraction of total osmolarity is ordinarily so small (300 mm H_2O) that even gross changes would not cause fluctuations in total osmolarity of quantitative importance in interpretation.

Among other possible osmotic variations which were considered are those due to varying effects of dissolved O_2 or CO_2 in serum. The recent studies of Meschia and Barron (1956) exclude osmotic effects of dissolved gases for explanatory purposes. These investigators reported that addition of CO_2 to whole blood resulted in an increase in osmotic pressure of 0.9 mOsm/g (H_2O) millimol. Conversely, reduction of one mM Hb/g H_2O caused a decrease in osmolarity of 0.3 mOsm/kg H_2O. Again this possible source of osmotic variation is considered to be non-contributory in explanation of large changes reported here.

It is thought that the variations in serum osmolarity described above are related to the observations of Rubin et al. (1956) concerning the relationships between total osmolarity measured directly and that calculated on the basis of known electrolyte and protein concentrations. This study was conducted on 250 patients with various disease states. In 172 patients, total osmolarity (although frequently outside the normal ranges) was accounted for by electrolyte concentrations. In the remaining 78 patients, however, observed osmolarity exceeded calculated values by 40-125 mOsm/g H_2O. The difference was unaccounted for by any of the commonly measured serum constituents. The authors postulated that one or several osmotically active substances appear in serum of critically ill patients, which to the time of publication had eluded identification. A similar report was made by Hamburger et al. (1950) who observed hyperosmolarity in the serum of four patients with acute and chronic renal disease. Hypertonicity was not explained by nitrogen retention, and serum electrolyte concentrations were anomalous.

A possibility exists that the hyperosmolarity reported above may have resulted from the appearance of this unidentified osmol(s) in the serum, initiated by the nutrient regimens and/or the concomitant dehydration.

D. GENERAL DISCUSSION

Before a general interpretation of the results presented here and in Vol. I, Section C of this report is attempted, it seems necessary to review briefly the current state of knowledge regarding physiological mechanisms controlling the diuretic response to water. An endeavor will be made to correlate results of the present studies with related observations made previously. Many of the interpretations must, of necessity, be of a speculative nature.

Early studies concerning controlling mechanisms in the renal response to ingested water were centered around the well-known sensitivity of kidney function to changes in blood composition. Thus, Baldes and Smirk (1934), in a series of careful determinations of serum osmotic pressure, observed that the ingestion of one liter of water was followed by a progressive decline in the total osmotic concentration. Maximum decreases occurred from 25-40 min following the ingestion, and were succeeded by a return to the pre-ingestion values. The maximum decline amounted to 1.5 to 2.75%, a dilution expected on the assumption that the water load would be distributed equally in all fluid compartments. Following these observations, an abundant confirmatory literature has accumulated regarding plasma dilution following water ingestion. Current concepts based on these observations consider that the truly important feature of the dilution is an increase in the mol fraction of water in the plasma following water ingestion.

Implication of the posterior pituitary hormones in water excretion became conclusive with the demonstration by Gilman and Goodman (1937) that dehydration or administration of hypertonic NaCl greatly increased the rates of production and excretion of the antidiuretic hormone in cats and rats. In the current view, the antidiuretic hormone (ADH) controls the rate of urine formation by virtue of its stimulating effect on the active reabsorption of water in the distal convoluted portion of the renal tubule. (No attempt will be made to review the vast literature bearing on this point. Reference is made to the monograph of Smith, 1951.)

It is clear that the secretion of ADH is regulated by some change in state of bodily hydration. In an excellent series of experiments, Verney (1947) demonstrated that antidiuresis can be evoked in dogs by injections into the carotid artery of quantities of hypertonic sodium chloride, sodium sulfate, or sucrose too small to have an effect when given intravenously. These results are interpreted as indicating the presence of osmoreceptors in some area supplied by the carotid arteries which stimulate secretion or release of ADH. Verney has tentatively suggested that these receptors are located in the supra-optic nuclei of the hypothalamus. In light of these observations, the characteristic diuretic response is evidently due to a suppression of ADH secretion by the increased hydration (decreased osmotic pressure) of plasma following water administration.

Numerous observers (e.g., Baldes and Smirk, 1934) have shown that maximal diuresis does not occur until well after the peak of hydration of the

plasma. The interval between diuresis and water administration is, obviously, prolonged if water is administered per os because of the time required for intestinal absorption. Nevertheless, recent experiments by Hollander and Williams (1957) have shown that the magnitudes of sustained diuresis are equal whether the water load is administered intravenously or by the oral route. Klisiecki et al. (1933) interpret the delay between maximal hydration and maximal diuresis to be attributable to the time required for ADH to disappear from the blood.

According to current concepts, then, the diuretic effect of water in healthy, well-hydrated animals may be summarized as follows. Administration of water via either oral or intravenous routes is followed by a hydremia which suppresses secretion of ADH by the posterior pituitary. After a short time-lapse, which is interpreted as the time necessary for disappearance of circulating ADH from the blood, renal excretion of water increases due to decreased active reabsorption. When the excess water has been excreted, balance is re-established and urine flow decreases to its pre-administration rate.

Numerous physiological and pathological conditions have been reported to cause aberrations in water diuresis. Some of these (primarily related to adrenocortical dysfunction) have already been mentioned. Two others, viz., salt-depletion and dehydration being more closely related to present results, require more thorough discussion.

One of the aberrances found in the present studies was a normal diuretic response to water in subjects dehydrated on salt-free, protein-free (CHO) diets. Although the four subjects in this phase study can hardly be considered to have become severely salt-depleted, subjects on CHO in the field study (see Vol. I) certainly incurred salt deficiency by virtue of large sweat losses. Both groups became osmotically depleted. In an early study of experimental sodium chloride deficiency in man, McCance (1935-36) produced the depletion by combining heavy sweat loss with salt-deficient diets. A corollary observation made in this study gave evidence that diuresis following copious water intake was both diminished and delayed. Because of the clinical significance of sodium depletion in the treatment of edema resulting from cardiac insufficiency, the "low-salt syndrome" has been thoroughly studied. Ample evidence is presented in the large literature concerning the subject that acute depletion results in profound circulatory disturbances, most of which in turn depress glomerular filtration rate. Thus the delayed diuresis as seen by McCance is associated with the latter phenomenon. Dicker (1948) has found that rats fed a protein deficient diet show diminished water diuresis, caused not by decreased glomerular filtration rate, but by a collection of the absorbed water in perirenal and retroperitoneal connective tissue. Thus, abnormal distribution of water administered per os may be a factor which must be considered.

Cizek and Huang (1951) have made a more direct and quantitative investigation into water diuresis in salt-depleted dogs. The animals were acutely depleted by intraperitoneal dialysis and maintained thereafter on a salt-free diet. In such animals, immediately following the dialysis water diuresis

was diminished and glomerular filtration was depressed. Following this initial depression, water diuresis became normal or supernormal in dogs kept on the salt-free diet for 1-2 weeks. Evidence presented indicated that the animals were in a state of salt-depletion hydropenia although water intake was not restricted. Preliminary studies by Gregerson, Walcott and Cizek (1951) indicated that normal water diuresis could be produced in three men in whom salt loss was promoted by sweating and a salt-free diet. Huang (1955) has shown that acute salt-depletion in rabbits by intraperitoneal dialysis resulted in a 48-hr. period of suppressed urine flow. When maintained on a low-salt diet following the dialysis, after 48 hours, a phase of polyuria and polydypsia developed in 10 of 11 animals. In all of the above investigations, water was allowed ad libitum. It is considered that these observations are analagous to subjects in the present study who subsisted on salt-free (CHO) regimens with unlimited water. It will be recalled that water diuresis within the normal limits defined was produced in such subjects (Figure III,31, Vol.I, p. 236).

A further observation may be made from the experiment of McCance (1935-36). During the period of salt-depletion, sweating was induced in a chamber. The magnitude of this loss was reported to have been about two liters per day. In order to maintain the deficiency of salt, the subjects were kept on a salt-free diet. The diet, however, included a mean nitrogen intake of 14.6 gm/day in the one subject for whom the data were recorded. This subject reported an absence of diuresis following "copious drinks of water". As compared to the present experiments, the diet is quite analagous to the CHO with casein regimen. McCance's subject, probably became dehydrated due to sweat loss and retained water drunk thereafter in a manner similar to our subjects dehydrated on the casein-supplemented regimen. The more recent experiments of Krnjevic (1955) include an experimental design essentially the same as that of McCance. Water-tolerance tests performed on two subjects after 10 days of salt-depletion showed marked reduction (32-52% recovery) in two subjects. The low-salt diet used included 11.1 gm N/day, again emphasizing the role of nitrogenous osmols in the antidiuretic characteristics of an experimental regimen.

The second type of abnormal response to a water load in the present study was the absence of diuresis in subjects dehydrated while osmotic excretion was elevated. According to the concepts of Marriott (1950) these men were in a state of water-depletion hydropenia, uncomplicated by salt (or osmotic) deficiency. It might be expected that subjects who had incurred a water deficit, when given water, would retain water in proportion to the magnitude of the deficit. Although uncomplicated dehydration is the most obvious of factors which might affect water diuresis, few quantitative studies have been conducted with a view to elucidating the relationships between the two variables. The results presented in Volume I of this report and those of Sargent et al. (1955) appear to be the only ones of this sort available. In contrast, the effects of salt-depletion hydropenia on water diuresis (see above) have been thoroughly studied.

Observations reported here raise one important question. Why do subjects dehydrated and osmotically depleted fail to retain water administered

orally whereas those dehydrated without simultaneous osmotic depletion retain water very effectively? Evidence presented here excludes the possibility that the distinct segregation of responses is due to changes in the glomerular filtration rate, i.e., is simply a function of renal hemodynamics. Explanation of these phenomena in terms of current knowledge concerning the physiological mechanisms of water excretion must then implicate differences in the release or in the specific activity (or both) of the antidiuretic hormone.

Little experimental evidence exists in support of the thesis of alteration of the specific activity of ADH on the distal convoluted tubule. Shannon (1942) demonstrated that administration of constant doses of pituitary extract to dogs with diabetes insipidus resulted in an inhibition of diuresis which is inversely proportional to the existing water load. This observation led him to suggest that the intrinsic activity of the renal tubule, and therefore its susceptibility to ADH, vary with water available for reabsorption. It is possible that in subjects of the present study on the low osmotic regimen, the relatively larger amount of osmotically unobligated water in tubular urine (see free-water clearances, Tables AVII.9 and AVII.10; and osmotic concentrations, Tables AVII.13 - AVII.16)caused diminished sensitivity to ADH, allowing excretion of the water load.

Much more evidence is available regarding the thesis of variation in the release of ADH in the two groups of subjects. The work of Verney (1947) cited above indicates that osmoreceptors located in the hypothalamus when stimulated by a sudden increase in plasma osmotic pressure in turn cause a secretion (or release) of ADH by the posterior pituitary. Other evidence indicates that plasma dilution suppresses the osmoreceptors and thus ADH secretion. However, in the experiments of Verney, it was reported that intracarotid injections of hypertonic glucose or urea were without effect in stimulation of ADH, presumably because the cells of the osmoreceptors are freely permeable to these two substances. Thus, no osmotic gradient, which is presumably the stimulating factor, is produced. It will be recalled that in the present experiments dehydration provoked sharp increases in serum osmolarity in all subjects, regardless of regimen. According to the analytical data regarding osmols contributing to total serum osmolarity, the distinct difference in diuretic response in the two groups is not explained on the basis of proportionately higher urea content in the serum of subjects on low osmotic regimens. If this were true, it could be postulated that these subjects showed normal water diuresis because of defective ADH release.

Verney also observed that prolonged perfusion with hypertonic NaCl resulted in a progressive decline in the quantity of ADH secreted, i.e., the osmoreceptors are capable of adaptation to hyperosmolarity, regardless of the nature of the contributing osmols. These observations explain the findings of Baldes and Smirk (1934), that normal water diuresis responses were obtained in men in whom serum hyperosmolarity was maintained by salt administration. Adaptation of osmoreceptors probably explain, as well, the mechanism which allowed normal water diuresis to occur in rabbits and rats dehydrated by promotion of extrarenal water loss by high temperature (Heller

and Smirk, 1932). The hypothesis of differential adaptation of osmoreceptors does not appear to be adequate in explaining present results, since serum osmolarity was elevated in both groups of subjects. Figure AVII.3 discloses that hyperosmolarity was uniformly more severe in subjects on high osmotic regimens. When results of the four experiments are compared on an absolute basis, however, the difference between values in two subjects or in groups of subjects does not appear to be consistent enough nor of magnitude sufficient to explain the differences in diuretic response. The possibility exists that the more severe serum hyperosmolarity in subjects on high osmotic regimens caused the circulating ADH level to be high enough so that destruction of this ADH did not ensue following water administration. In such a case no diuresis would occur.

The ordinary sequence of events resulting in water diuresis after oral water ingestion has already been reviewed above. It has been shown (Dicker, 1948) that in a 30-minute period following water ingestion in rats, there is a transfer of electrolytes from the extracellular fluid into the gastrointestinal tract. The net result of this shift is an apparent dilution of the extracellular fluid which is subsequently accentuated by absorption of the ingested water. Two compensatory mechanisms become operative to reduce the extracellular fluid dilution, viz., suppression of ADH secretion to allow diuresis and a movement of water to the intracellular compartment. The latter movement has also been shown in dogs by Leaf et al. (1954). Interpretation of present results in view of this electrolyte transfer yields a speculative correlation between the concept of osmotic depletion and well-established knowledge concerning factors controlling release of ADH. It may be considered that subjects on a low osmotic regimen become osmotically depleted in the sense that a negative osmotic balance is maintained for prolonged periods. Such a depletion, i.e., a decrease in the total content of osmotic materials in all body fluids, may occur despite an increase in their concentration in the fluids, when osmotic depletion is accompanied by dehydration. It may also be speculated that depletion would include contributions from both intracellular and extracellular-fluid compartments. Administration of a water load to a subject in this osmotically-depleted state would lead to water diuresis in spite of a severe water deficit for two reasons. First, the electrolyte shift to the gastrointestinal tract and the subsequent absorption of water would result in plasma dilution, thus suppressing ADH secretion. Second, if it is assumed that intracellular osmotic depletion has occurred, the osmotic gradient between intracellular and extracellular phases would be reduced, and the compensatory shift of absorbed water to the intracellular phase would be defective or absent. In contrast, the shift of water would be intensified rather than reduced in a subject dehydrated without osmotic depletion. The degree of plasma dilution would be reduced both by the hyperosmolarity existing at the time of water ingestion and by the compensatory shift of water to the intracellular compartment. Thus, diuresis would be prevented in this instance.

These interpretations concerning mechanisms are obviously speculative, and are supported only to a very limited extent by quantitative observations made during the study. The need for further investigation is also obvious, particularly as regards to the secretion of ADH in the course of chronic

dehydration and during water-loading tests. Equally important is the need for quantitative study of the nature and physiological effects of osmotic depletion, a phenomenon which may be of fundamental significance in the interpretation of observations concerning water metabolism and body fluid distribution.

E. SUMMARY AND CONCLUSIONS

1. On the basis of studies detailed in Volume I, it was concluded that the three parameters --- total body water, osmotic load, and water diuresis --- are mathematically interdependent. Further, it was concluded that renal mechanisms for conservation of water under conditions of water deprivation are regulated largely by urinary osmotic excretion or some related parameter.

2. In order to study further this interdependence in dehydrated men, a phase study was carried out on four men. Three nutrient regimens were devised to provide very low or moderately high rates of osmotic excretion. The low osmotic regimen used was pure carbohydrate, supplied at a level of 2000 Calories per day. Osmotic excretion was elevated by the addition of 14.62 gm of NaCl or 125 gm of casein (substituted isocalorically) per day. During the periods of dietary restriction, dehydration was produced by limitation of water intake to 900 ml/day. Each subject subsisted once on the low osmotic regimen and once on either the NaCl- or casein-supplemented regimen.

3. The diuretic effect of water was studied as above on each subject on the day prior to the beginning of the restriction, and at the end of the period of water and nutrient restriction. Osmotic excretion was determined on daily urine specimens by means of the freezing-point depression technique.

4. Subjects dehydrated while on the low osmotic regimen demonstrated water diuresis comparable to a well-hydrated individual (mean recovery of water load, 59%), in contrast to the results obtained on a high osmotic regimen (mean recovery, 4%). These results regarding water diuresis were the same regardless of whether the osmotic material being excreted was primarily electrolyte (NaCl) or non-electrolyte (urea).

5. From this study, it is concluded that the interdependence described in Volume I is a reproducible phenomenon, and that an osmol of electrolyte and an osmol of non-electrolyte are equivalent in their ability to prevent diuresis in a dehydrated man.

6. Several measurements of renal function, viz., creatinine, urea, and osmotic clearances failed to reveal the existence of renal mechanisms which would account for differences in diuretic response to water in the two types of regimens. A discussion (based in part on measurements of serum osmolarity) is presented which incorporates several current concepts regarding the role of the posterior pituitary-renal axis in the control of water excretion.

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G. TABLES OF ORIGINAL DATA

TABLE AVII.13

URINARY VOLUME AND CONSTITUENTS: SUBJECT R.A.

Date	Fluid Intake (ml/day)	Urine Volume 24-hr. (ml)	Urine Volume min. (ml)	Osmolarity (mOsm/l)	Electrolyte Na (mEq/L)	Electrolyte K (mEq/L)	Nitrogenous Total (gm/100 ml)	Nitrogenous N Urea N (gm/100 ml)	Creatinine (mg/100 ml)
EXPERIMENT A-I: EXP REGIMEN CHO with NaCl									
Feb. 11	ad lib.	1150	0.80	825	216	57	0.794	0.72	173
13	2980	1530	1.06	409	70	32	0.580		113
14	3320	3200	2.22	278	83	16	0.242		64
15	2700	2190	1.52	304	89	20	0.219	0.15	76
16	2700	1575	1.09	357	105	20	0.265		102
17	900	595	0.41	883	288	56	0.510		275
18	900	680	0.47	969	430	48	0.538	0.46	272
19	900	700	0.49	1001	443	45	0.571		265
20	900	500	0.35	1034	357	40	0.642	0.45	335
21	1000	580	0.40	1032	349	40	0.706		320
22	900	690	0.48	1088	492	36	0.648	0.52	259
24	1820	1850	1.28	493	89	6	0.758		109
25	2670	1685	1.17	577	131	8	0.682		95
26	1600	3095	2.15	376	103	3	0.427		68
27	2150	2890	2.00	504	154	14	0.445		63
28	1510	2500	1.74	507	143	15	0.523	0.44	64
EXPERIMENT A-II: EXP REGIMEN CHO									
Mar. 14	2850	2715	1.89	514	146	39	0.488		81
15	3050	2690	1.86	425	105	34	0.418		78
16	2750	3135	2.18	348	86	21	0.386		74
17	2750	2840	1.97	393	107	31	0.371	0.30	70
19	900	860	0.60	533	50	105	0.841		65
20	900	550	0.38	516	43	58	0.824		97
21	900	470	0.33	601	36	59	1.139	0.97	152
22	1000	335	0.23	791	56	77	1.382		550
23	420	245	0.17	942	65	75	1.075	1.05	785
24	2700	1830	1.27	228	10	12	0.480	0.50	103
25	2700	2380	1.65	155	11	9	0.294		77
26	2350	705	0.49	673	89	33	1.203		253
27	2300	1950	1.35	537	139	29	0.623		107
28	2300	1725	1.20	546	133	25	0.658	0.59	116

TABLE AVII.14

URINARY VOLUME AND CONSTITUENTS: SUBJECT F. S.

Date	Fluid Intake (ml/day)	Urine Volume 24-hr (ml)	Urine Volume min (ml)	Osmolarity (mOsm/L)	Electrolyte Na (mEq/L)	Electrolyte K (mEq/L)	Nitrogenous Total N (gm/100 ml)	Nitrogenous Urea N (gm/100 ml)	Nitrogenous Creatinine (mg/100 ml)
EXPERIMENT A-I: EXP REGIMEN with CHO									
Feb. 11	ad lib.	1670	1.15	786	158	31	1.118	1.10	131
13	2700	2710	1.88	252	31	22	0.349	----	71
14	2700	2575	1.78	204	25	14	0.326	----	83
15	2700	2310	1.60	204	25	16	0.367	0.22	93
16	2700	1785	1.24	208	6	18	0.367	----	115
17	900	355	0.25	687	5	86	1.044	----	436
18	900	375	0.26	806	8	75	1.468	1.22	503
19	900	520	0.39	618	6	45	1.142	----	371
20	900	275	0.19	906	18	74	2.189	1.28	604
21	1000	405	0.28	675	13	37	1.335	----	453
22	900	265	0.18	883	11	59	1.595	1.33	714
24	1600	805	0.56	776	68	25	1.557	----	263
25	1600	920	0.64	903	123	16	1.693	----	229
26	1620	1665	1.16	602	113	5	1.015	----	141
27	1680	1952	1.36	583	130	16	0.738	----	118
28	1420	2580	1.79	545	138	34	0.564	0.50	75
EXPERIMENT A-II: EXP REGIMEN with NaCl									
Mar. 14	1560	1340	0.93	811	139	66	1.194	----	156
15	2100	1980	1.38	600	124	44	0.766	----	97
16	1660	1015	0.70	941	166	78	1.254	----	191
17	1760	2200	1.53	582	121	45	0.774	0.85	111
19	900	655	0.46	1080	144	142	1.266	----	301
20	900	665	0.46	1090	252	128	1.041	----	281
21	900	735	0.51	1064	285	98	0.975	0.81	277
22	1000	810	0.56	1024	324	79	0.842	----	244
23	900	1120	0.78	969	358	58	0.713	0.59	216
24	2700	2000	1.38	422	110	19	0.458	0.38	89
25	3180	2800	1.95	290	95	13	0.230	----	64
26	2100	1545	1.07	675	223	9	0.622	----	135
27	1660	1295	0.90	822	201	17	1.091	----	152
28	2020	1410	0.98	855	215	18	1.157	1.16	138

TABLE AVII.15

URINARY VOLUME AND CONSTITUENTS: SUBJECT C. M.

Date		Fluid Intake (ml/day)	Urine Volume 24-hr (ml)	Urine Volume min (ml)	Osmolarity (mOsm/L)	Electrolyte Na (mEq/L)	Electrolyte K (mEq/L)	Nitrogenous Total (gm/100 ml)	Nitrogenous N Urea N (gm/100 ml)	Creatinine (mg/100 ml)
					EXPERIMENT B-I: EXP REGIMEN CHO with CASEIN					
Mar.	14	2065	1870	1.30	502	79	41	0.704	----	88
	15	2260	1655	1.15	526	194	43	0.741	----	92
	16	2450	1825	1.27	456	94	37	0.590	0.60	80
	18	900	855	0.59	972	70	80	1.712	----	157
	19	900	790	0.55	1163	61	74	2.253	----	178
	20	900	790	0.55	1205	32	69	2.511	1.46	187
	21	1000	750	0.52	1169	15	65	2.472	----	202
	22	900	840	0.58	1120	12	56	2.485	2.71	186
	24	2915	2390	1.66	464	5	11	1.061	0.88	74
	25	2655	835	0.58	809	25	13	1.736	----	196
	26	3280	1515	1.05	433	38	7	0.922	----	122
	27	2750	1350	0.94	536	93	7	0.845	0.75	114
					EXPERIMENT B-II: EXP REGIMEN CHO					
Apr.	2	2700	2560	1.78	469	98	47	0.583	----	73
	3	2960	2270	1.58	428	57	56	0.631	0.63	75
	5	3115	2720	1.89	189	15	24	0.280	----	55
	6	2980	2365	1.64	139	14	24	0.183	0.22	60
	7	900	700	0.49	363	22	49	0.546	----	192
	8	900	730	0.51	369	22	43	0.626	0.54	202
	9	1000	450	0.31	537	36	54	0.936	----	329
	10	500	300	0.21	743	40	90	1.282	1.33	483
	11	2900	1000	0.70	515	85	15	0.974	----	162
	12	2500	1645	1.14	437	87	12	0.607	0.69±	211
	13	2420	2090	1.45	423	109	21	0.531	----	74

TABLE AVII.16

URINARY VOLUME AND CONSTITUENTS: SUBJECT D. D.

Date		Fluid Intake (ml/day)	Urine Volume 24-hr (ml)	Urine Volume min (ml)	Osmolarity (mOsm/L)	Electrolyte Na (mEq/L)	Electrolyte K (mEq/L)	Nitrogenous Total N (gm/100 ml)	Nitrogenous Urea N (gm/100 ml)	Creatinine (mg/100 ml)
EXPERIMENT B-I: EXP REGIMEN CHO										
Mar.	14	2450	1850	1.28	594	119	36	0.827	----	103
	15	1650	1040	0.72	1047	176	76	1.530	----	189
	16	2200	1550	1.08	874	210	48	1.190	1.12	130
	18	900	925	0.64	757	112	60	1.176	----	180
	19	900	400	0.28	933	78	108	1.537	----	430
	20	900	315	0.22	999	58	105	1.749	2.19	585
	21	1000	305	0.21	1027	36	118	1.876	----	607
	22	900	275	0.19	1095	30	123	2.029	1.89	679
	24	2050	1275	0.89	230	10	17	0.433	0.48	173
	25	2800	520	0.36	905	51	35	1.889	----	331
	26	2750	915	0.64	960	223	33	1.482	----	223
	27	2400	1780	1.24	699	229	24	0.793	0.81	120
EXPERIMENT B-II: EXP REGIMEN CHO with CASEIN										
Apr.	2	1900	1240	0.86	1019	234	91	1.219	----	163
	3	3150	1395	0.97	847	161	72	1.156	1.21	135
	5	2700	1560	1.08	698	64	44	1.270	----	128
	6	2700	1190	0.83	915	34	48	1.896	2.12	158
	7	900	835	0.58	1217	36	47	2.684	----	203
	8	900	740	0.51	1324	21	54	2.827	3.08	239
	9	1000	690	0.48	1425	19	67	2.026	----	277
	10	310	550	0.38	1469	11	61	3.215	3.66	327
	11	2900	760	0.53	1077	8	27	2.190	----	226
	12	3700	1400	0.97	699	87	19	1.248	1.63	151
	13	3000	1840	1.28	675	191	19	0.754	----	120

TABLE AVII.17

BODY WEIGHTS: EXPERIMENTS A-I AND A-II

Experiment	Date	Body Weight (kg) Subject R.A.	Subject F.S.
A-I	Feb. 12	72.82	94.20
	" 14	71.70	92.05
	" 16	69.89	90.68
	" 17	68.18	90.23
	" 18	68.15	89.54
	" 19	68.18	89.20
	" 21	68.06	88.52
	" 23	67.39	87.95
A-II	Mar. 18	69.54	91.36
	" 20	69.09	90.23
	" 22	68.18	88.86
	" 23	67.71	88.36

TABLE AVII.18

BODY WEIGHTS: EXPERIMENTS B-I AND B-II

Experiment	Date	Body Weight (kg) Subject C.M.	Subject D.D.
B-I	Mar. 15	63.86	77.30
	" 16	63.63	76.80
	" 17	63.19	74.80
	" 18	62.96	75.22
	" 19	62.27	74.31
	" 20	61.70	73.40
	" 21	61.13	72.95
	" 22	60.68	72.50
	" 23	60.45	71.59
	" 24	61.36	72.50
	" 25	62.15	71.81
	" 26	63.86	73.18
	" 27	64.65	74.31
B-II	Apr. 4	63.63	75.00
	" 5	62.50	75.45
	" 6	62.73	74.55
	" 7	61.82	73.41
	" 8	61.14	72.27
	" 9	60.91	71.36
	" 10	60.68	70.45
	" 11	61.36	71.36
	" 12	61.93	72.95
	" 13	62.72	74.31

TABLE AVII.19

ADDIS COUNTS OF URINARY SEDIMENTS

Subject	Experiment	Date	Urinary Excretion of Elements (No./min x 10^{-3}) White Blood Cells	Epithelial Cells	Red Blood Cells	Casts
R.A.	A-I	Feb. 16	13.6	27.2	0	0
		Feb. 21	20.8	20.8	0	0
		Feb. 23	127.9	76.8	0	0
R.A.	A-II	Mar. 22	158.4	79.2	0	8.8
		Mar. 23	*			
F.S.	A-I	Feb. 16	10.9	10.9	0	0
		Feb. 21	417.6	46.4	0	23.2
		Feb. 23	90.0	6.0	0	6.0
	A-II	Mar. 22	708.0*	141.0	0	0
		Mar. 23	360.0	300.0	93.6	13.3
C.M.	B-I	Mar. 21	4.8	4.8	0	0
		Mar. 23	14.4	43.2	0	0
	B-II	Apr. 9	31.2	31.2	0	0
D.D.	B-I	Mar. 21	39.6	79.2	0	0
		Mar. 23	204.0	122.4	4.5	4.5
	B-II	Apr. 9	26.7**	17.8	119.9	4.4
		Apr. 10	39.0**	23.0	31.3	16.0

* Contained amorphous material (urates, etc.) in sufficient quantity to make accurate estimations impossible or questionable.

** Contained large amounts mucus. Several granular casts clearly discernable.

APPENDIX VIII

OSMOTIC REGULATION BY ECCRINE SWEAT GLAND
(Prepared in Collaboration with R.W. Adams)

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A. INTRODUCTION

There have been many studies concerning the chemical composition of sweat: Talbert and associates (11, 13, 99, 112, 113, 114); Fishberg and Bierman (21); Whitehouse (131); Dill, Hall, and Edwards (20); Johnson and associates (44, 92, 100); Lobitz and associates (65, 66, 67, 68, 69, 70); Ladell (57, 59, 60, 61); Weiner and Van Heyningen (126, 127, 128, 129, 130); and many more. These studies range from the simple analysis of sweat electrolyte constituents, as by Mosher (84) and Mitchell and associates (82, 83) to the complex effect of DCA on the chemical constituents of sweat from healthy subjects (Ladell, 58; Robinson, Kincaid and Rhamy, 96) and from nephrotic patients as by Conn (14) and Warming-Larsen (125). Tables AVIII.1 - AVIII.6 show a fraction of the individual data on solutes. The amount of such data that may be found is enormous. However, only a small amount will be presented to show the differences in the values obtained by different investigations and for the comparisons of the values obtained in the present investigation. Table AVIII.1 contains a selected list of cations that have been reported. Tables AVIII.2 - AVIII.6 presents a similar literature survey of anions, carbohydrate and its metabolites, nitrogenous compounds, fatty acids and related substances, and trace substances, respectively.

The range of experimental conditions, modes of collection, and types of subjects used by the investigators is wide. Dill et al. (20) collected work sweat and divided the specimens into two groups using rate of sweating - - low rates (a) and high rates (b) - - as criteria. Davies (19) collected thermal sweat from males (a and c) and females (b and d) at two time intervals - - 15 minutes (a and b) and 30 minutes (c and d). Johnson et al. (45) collected work sweat from two groups of subjects - - controls (a) and experimentals (b). Cornbleet (16) and Adams et al. (2) fractionated their sweat samples into filtered (a) and nonfiltered (b) samples, so as to determine the amount of bromine and iron held by the exfoliating skin. McClure et al. (78) collected specimens under two environmental conditions - a comfortable environment (a) and a hot, moist environment (b). Lobitz and Osterberg (66) collected sweat from males (a and c) and females (b and d) at different sweating rates - - profuse (a and b) and intermittent (c and d).

The actual means of obtaining sweat directly from a subject is extremely variable. It has been obtained by scraping it from the exposed skin (19, 76, 82); by washing the skin and clothing with distilled water (20, 26, 78, 95, 129, 131); by absorbing it with filter paper (126); by the use of open enamel pans for direct collection (50); by direct collection in an irradiated glass arm chamber (5, 33, 34); or by the use of impermeable arm bags or rubber gloves (2, 4, 44, 50, 60, 61, 62, 64, 66, 92, 95, 100, 130).

Table AVIII.7 lists some factors affecting chloride concentration in sweat. These factors play an important role in experimental design and are probably related to the great variation evident in Tables AVIII.1 through AVIII.6, but will not be discussed further in this paper.

A review of the sweat literature makes one fact apparent: there is a

TABLE AVIII.1

SURVEY OF LITERATURE ON SWEAT CHEMISTRY:
INORGANIC SUBSTANCES; CATIONS

	Mean	Range	Source
A.	**Sodium** (mEq/L)		
a)	23.3	7.30-40.4	Dill et al. (20)
b)	31.9	13.3-52.7	
	31.7	18-47	Conn (14)
a)	58.4	19.6-95.5	Davies (19)
b)	46.8	16.8-92.6	
c)	64.6	21.8-100.0	
d)	57.1	41.3-74.5	
	35.7	14.5-57.7	Robinson et al. (95)
	34.0	11-98	Locke et al. (71)
	42.8	20-86.2	Ahlman et al. (3)
	47.9	9.8-77.2	Amatruda and Welt (4)
	20.1	8-47	Lichton (64)
	39.5	6.2-85.2	Schwartz and Thaysen (103)
a)	27.54	11-63	Johnson et al. (45)
b)	41.24	11-99	
B.	**Potassium** (mEq/L)		
	Not given	7.2-37.2	Talbert et al. (113)
	4.76	3.58-5.37	Whitehouse (131)
a)	2.7	1.9-3.3	Dill et al. (20)
b)	3.1	2.3-4.2	
	6.3	4.0-11.6	Locke et al. (71)
	9.0	5.2-15.8	Ahlman et al. (3)
	5.9	3.9-9.2	Amatruda and Welt (4)
	5.1	3.0-8.5	Lichton (64)
	9.5	5.0-21.8	Schwartz and Thaysen (103)
a)	8.60	4.5-19.0	Johnson et al. (45)
b)	11.92	4.0-32.0	
C.	**Calcium** (mEq/L)		
	Not given	2.4-5.0	Bryant and Talbert (11)
	2.34	Not given	Carpenter and Talbert (13)
	Not given	0.18-5.90	Talbert et al. (113)
	0.96	0.2-2.28	Mitchell et al. (82)
	1.67	0.57-3.06	Johnston et al. (50)
D.	**Magnesium** (mEq/L)		
	0.98	Not given	Carpenter and Talbert (13)
	Not given	0.12-3.70	Talbert et al. (113)
	0.156	0.032-0.32	Mitchell et al. (82)

TABLE AVIII.1 (Contd)

	Mean	Range	Source
E.	Copper (mEq/L)		
	0.0018	0.0014-0.0026	Mitchell et al. (82)
F.	Manganese (mEq/L)		
	0.002	0.0012-0.0028	Mitchell et al. (82)
G.	Iron (Ferric, mEq/L)		
	0.096	0.054-0.108	Mitchell et al. (82)
a)	0.378	0.042-1.047	Adams et al. (2)
b)	0.015	0.0-0.116	
	0.014	0.012-0.024	Johnston et al. (50)

TABLE AVIII.2

SURVEY OF LITERATURE ON SWEAT CHEMISTRY:
INORGANIC SUBSTANCES; ANIONS

	Mean	Range	Source
A.	Chloride (mEq/L)		
	147.79	109.86-169.58	Mosher (84)
	63.76	32.14-97.57	Whitehouse (131)
a)	25.9	10.1-43.8	Dill et al. (20)
b)	31.9	17.8-48.5	
	27.3	15-42	Conn (14)
a)	56.6	22.0-98.0	Davies (19)
b)	45.7	21.4-93.8	
c)	66.9	19.2-102.4	
d)	55.7	37.1-92.0	
	35.3	14.5-56.4	Robinson et al. (95)
	27.5	6-87	Locke et al. (71)
	30.9	13.5-68.2	Ahlman et al. (3)
	108.46	50.5-214.6	Van Heyningen (120)
	40.4	5.2-65.1	Amatruda and Welt (4)
	20.3	6.0-38.0	Lichton (64)
a)	25.93	11-63	Johnson et al. (45)
b)	37.60	10-100	
B.	Iodine (mEq/L)		
	Trace	Trace	Thiodet and Ribere (117)
	0.00006	0.00004-0.00001	Spector et al. (107)

TABLE AVIII.2 (Contd)

	Mean	Range	Source
C.	Bromine (mEq/L)		
a)	0.0032	0.0021-0.0052	Cornbleet (16)
b)	0.0039	0.0023-0.0063	
D.	Fluorine (mEq/L)		
a)	0.042	0.021-0.079	McClure et al. (78)
b)	0.105	0.058-0.205	
E.	Sulfate (Inorganic, mEq/L)		
	0. 020	0.417-1.250	Mosher (84)
	0.832	0.208-1.456	Whitehouse (131)
F.	Inorganic Phosphorus (mMol/L)		
	0.773	0.209-1.386	Mitchell et al. (82)
G.	Total Sulfur (mMol/L)		
	Not given	Trace-0.230	Talbert et al. (113)

TABLE AVIII.3

SURVEY OF LITERATURE ON SWEAT CHEMISTRY:
CARBOHYDRATES AND METABOLITES

	Mean	Range	Source
A.	Glucose (mMols/L)		
	Not given	0.38-1.42	Levin and Silbers (63)
	0.84	0.33-1.22	Mosher (84)
a)	1.11	Not given	McSwiney (79)
b)	0.70	Not given	
a)	0.31	0.00-0.61	Lobitz and Osterberg (66)
b)	0.22	0.00-0.49	
c)	0.52	0.00-0.72	
d)	0.47	0.00-0.89	
	Not given	0.06-0.61	Itch et al. (33)
B.	Lactic Acid (mEq/L)		
	10.40	7.91-17.81	Saiki et al. (99)

TABLE AVIII.3 (Contd)

Mean	Range	Source
	27.75-33.30	Fishberg and Bierman (21)
8.18	6.44-11.88	Mosher (84)
9.82	7.32-13.54	Whitehouse (131)
Not given	3.66-15.54	Nitta (86)
16.97	11.1 -37.4	Weiner and Van Heyningen (130)
a) 16.62	2.5 -33.5	Johnson et al. (45)
b) 20.02	2.0 -33.9	
C. Pyruvic Acid (mEq/L)		
Not given	0.10-0.78	Itch et al. (33)
D. Citric Acid (mEq/L)		
0.005	Not given	Peck et al. (91)

TABLE AVIII.4

SURVEY OF LITERATURE ON SWEAT CHEMISTRY: NITROGENOUS COMPOUNDS

Mean	Range	Source
A. Total Nitrogen (mg/100ml)		
Not given	22.5-144.9	Levin and Silvers (63)
Not given	60-122	Voit (124)
a) 33.2	25.6-51.3	Dill et al. (20)
b) 28.0	21.2-40.3	
a) 17.0	13.6-22.7	Mitchell et al. (82)
b) 26.7	19.8-30.0	
Not given	30-50	Jiro (38)
35.4	33.0-42.1	Araki and Ando (5)
B. Non-Protein Nitrogen (mg/100ml)		
82.17	66-108	Mosher (84)
C. Amino Acid Nitrogen (mg/100ml)		
Not given	1.66-4.76	Talbert and Haugen (112)
3.05	2.4-3.7	Mosher (84)
a) 6.5	Not given	McSwiney (79)
b) 5.0	Not given	
Not given	1.8	Itch and Nakayama (35)
3.82	3.2-6.2	Araki and Ando (5)

TABLE AVIII.4 (Contd)

	Mean	Range	Source
D.	Individual Amino Acids Nitrogen (mg/100ml)		
1.	Arginine	0.1-0.18	Hier et al. (31)
		0.1-0.5	Araki and Ando (5)
2.	Histidine	0.07-0.09	Hier et al. (31)
		0.1-0.5	Araki and Ando (5)
3.	Threonine	0.03-0.07	Hier et al. (31)
		0.1-0.5	Araki and Ando (5)
		10.0	Pankov (90)
4.	Lysine	0.02	Hier et al. (31)
		0.1-0.3	Araki and Ando (5)
5.	Tyrosine	0.02-0.04	Hier et al. (31)
		0.0-0.5	Araki and Ando (5)
6.	Valine	0.02-0.04	Hier et al. (31)
		0.00-0.03	Araki and Ando (5)
		5.0	Pankov (90)
7.	Leucine	0.02-0.04	Heir et al. (31)
		0.0-0.3	Araki and Ando (5)
8.	Phenyl-alanine	0.01-0.03	Hier et al. (31)
		0.0-0.3	Araki and Ando (5)
9.	Serine	0.0-0.3	Araki and Ando (5)
		10.0	Pankov (90)
10.	Aspartic Acid	0.0-0.3	Araki and Ando (5)
		5.0	Pankov (90)
11.	Glutamic Acid	0.0-0.3	Araki and Ando (5)
		6.0	Pankov (90)
12.	Histamine	0.0-0.07	Uuspaa (119)
		0-0.1	Araki and Ando (5)
13.	Tryptophane	0.01	Hier et al. (31)
		0.0-0.1	Araki and Ando (5)
14.	Methionine	0-0.1	Araki and Ando (5)
		4.0	Pankov (90)
15.	Cystine	0-0.1	Araki and Ando (5)
16.	Alanine	6.0	Pankov (90)
17.	Isoloncine	0.01-0.03	Hier et al. (31)
E.	Ammonia (mEq/L)		
	7.98	5.71-10.71	Mosher (84)
a)	6.0	Not given	McSwiney (79)
b)	4.7		
	Not given	0.7-7.64	Itch and Nakayama (35)
	3.87	2.14-5.14	Araki and Ando (5)
	2.46	1.21-4.00	Amatruda and Welt (4)
a)	7.40	4.92-11.32	Johnson et al. (45)
b)	9.67	3.29-16.73	

TABLE AVIII.4 (Contd)

	Mean	Range	Source
F. Urea (mMol/L)			
	9.25	6.00-14.11	Barney (7)
	10.93	7.14-14.64	Barney (8)
	20.24	14.29-28.93	Mosher (84)
a)	6.87	Not given	McSwiney (79)
b)	7.66		
	12.14	8.21-16.43	Whitehouse (131)
	Trace	Trace	Peck et al. (91)
	9.44	5.7-15.5	Van Heyningen (120)
	7.22	5.36-10.43	Araki and Ando (5)
	3.08	2.21-4.32	Amatruda and Welt (4)
a)	14.79	8.57-22.63	Johnson et al. (45)
b)	19.31	6.57-33.46	
G. Uric Acid (mMol/L)			
	0.28	0.13-0.45	Saiki et al. (99)
	0.06	0.04-0.09	Mosher (84)
		0-0.05	Lobitz and Mason (69)
H. Creatinine (mMol/L)			
	0.14	0.05-0.19	Mosher (84)
		0.04-0.11	Ladell (59)
a)	0.19	0.12-0.45	Bass and Dobalian (9)
b)	0.05	0.03-0.08	
a)	0.07	0.0-0.16	Johnson et al. (45)
b)	0.07	0.01-0.38	
I. Creatinine (mMol/L)			
	Trace	Trace	Mosher (84)

TABLE AVIII.5

SURVEY OF LITERATURE ON SWEAT CHEMISTRY:
FATS, THEIR DERIVATIVES, AND RELATED SUBSTANCES

Mean	Range	Source
1. Acetic Acid (mMol/L)		
0.0016	Not given	Peck, Rosenfield et al. (91)
2. Propionic Acid (mMol/L)		
0.0009	Not given	Peck et al. (91)

TABLE AVIII.5 (Contd)

Mean	Range	Source
3. Caprylic and/or Caproic Acid (mMol/L)		
0.0003	Not given	Peck, et al. (91)
4. Cholesterol (mMol/L)		
0.0008	Not given	Thiodet and Ribere (117)
5. Ethyl Alcohol (mMol/L)		
0.0054	Not given	Nyman and Palmlov (87)
6. Total Ketone Bodies (mMol/L)		
a) 0.35	0.08-1.60	Johnson et al. (45)
b) 0.57	0.08-2.05	
0.118	0.035-0.421	Johnson and Sargent (49)
7. Acetone (mMol/L)		
0.011	0.0-0.041	Johnson and Sargent (49)
8. Acetoacetic Acid (mMol/L)		
0.050	0.014-0.166	Johnson and Sargent (49)
9. Beta-Hydroxybutyric Acid (mMol/L)		
0.057	0.0-0.357	Johnson and Sargent (49)

TABLE AVIII.6

SURVEY OF LITERATURE ON SWEAT CHEMISTRY:
VITAMINS IN SWEAT

Vitamin	Concentration (microgm/100 ml)	Source
Thiamine	8.2-150	Hardt and Still (27)
	0.1-0.7	Slater (106)
	0.03-0.7	Tennent and Silber (116)
	6.0-60.0	Cornbleet et al. (17)
	0-0.2	Mickelson and Keys (80)
	0.2-0.3	Mitchell et al. (83)
	0	Sargent et al. (100)
	0.1-0.3	Okuda (1948)

TABLE AVIII.6 (Contd)

Vitamin	Concentration (microgm/100 ml)	Source
Diphosphothiamine	0	Sargent, et al. (100)
	0	Okuda (89)
Riboflavin	0.9-7.0	Tennent and Silber (116)
	3.0-30.0	Cornbleet et al. (17)
	0-0.5	Mickelson and Keys (80)
	0.7-1.0	Mitchell et al. (83)
	0	Sargent et al. (100)
Nicotinic Acid (N^1--methylnicotinamide)	10-46	Cornbleet et al. (17)
	10	Mickelson and Keys (80)
	4-5	Mitchell et al. (83)
	0-10	Sargent et al. (100)
Nicotinic Acid and Metabolites	8-14	Johnson et al. (41)
Pantothenic Acid	2-30	Tennent and Silber (116)
	12-80	Cornbleet et al. (17)
	1.6-7.7	Spector et al. (108)
Pyridoxine	0.084	Johnson et al. (39)
Pyridoxine and Metabolites	7.0	Johnson et al. (39)
Pseudopyridoxine	3.24	Johnson et al. (39)
Inositol	21	Johnson et al. (43)
P-Aminobenzoic Acid	0.24	Johnson et al. (43)
Folic Acid	0.26	Johnson et al. (42)
Choline	3-15	Johnson et al. (40)
Ascorbic Acid	550-640	Cornbleet et al. (18)
	100-200	Zselyonka and Nanassy-Megay (133)
	24-57	Wright and MacLenathon (132)
	86.2-420	Peck et al. (91)
	180-200	Hardt and Still (27)
	0	Tennent and Silber (116)
	0-180	Mickelson and Keys (80)
	0-15	Kirch et al. (52)
	0	Sargent et al. (100)
	19	Shields et al. (105)

TABLE AVIII.6 (Contd)

Vitamin	Concentration (microgm/100 ml)	Source
Dehydro Ascorbic Acid	60-150	Kirch et al. (52)
	0-200	Tennent and Silber (116)
	0-200	Sargent, Robinson, and Johnson (100)
	0-70.5	Shields et al. (105)
Total Ascorbic Acid	500-1100	Bernstein (10)
	0-200	Tennent and Silber (116)
	0-200	Sargent et al. (100)

TABLE AVIII.7

FACTORS CONTROLLING CHLORIDE CONCENTRATION IN SWEAT

Factor	Effect on Sweat Chloride	Source
1. Duration of thermal sweating during single exposure	Increases with time	Hancock et al. (26) Ladell et al. (57)
2. Rate of sweating	Increases with increasing rate of sweating	Johnson et al. (44) Kittsteiner (53) Kittsteiner (54) Locke et al. (71)
3. Temperature of skin	Increases with increasing skin temperature	Hancock et al. (26) Locke et al. (71) Robinson et al. (95) Weiner and Van Heyningen (129)
4. Salt intake	Increases with increasing sodium chloride; decreases with increasing potassium	Kittsteiner (53) Kittsteiner (54) Locke et al. (71) Robinson et al. (97)
5. Acclimatization	Decreases with acclimatization	Conn (14) Cerking and Robinson (23) Johnson et al. (44) Ladell (61) Ladell et al. (62) Robinson et al. (95) Talbott et al. (115) Weiner and Van Heyningen (129)

TABLE AVIII.7 (Contd)

	Factor	Effect on Sweat Chloride	Source
6.	Environmental temperature		
	a) seasonal	Increases with decreasing environmental temperature	Davies and Clark (19) Locke et al. (71)
	b) constant environment e.g., summer	Increases with increasing environmental temperature	Robinson et al. (95)
7.	Degree of hydration		
	a) water only	Decreases with increased hydration; increases with increasing amounts of water	Johnson et al. (44) Ladell (60) Pitts et al. (92)
	b) water and sodium chloride	Increases with increasing amounts of combined intake	Ladell (61) McCance (77) Pitts et al. (92)
8.	Rectal temperature	Increases with increasing rectal temperature	Johnson et al. (44)
9.	Exercise	Increases with increased exercise	Iwatake (37)
10.	Inhalation of carbon dioxide	Increases with increasing amounts of carbon dioxide	Adachi (1)
11.	Hemihidrotic reflex	Increases on contralateral side, decreases on ipsilateral side	Kawase (51) Ogata and Ichihashi (88) Takagi and Sakurai (111)
12.	Occlusion of blood supply	Decreases in ischaemic arm, increases in normal arm with time	Randall et al. (93) Van Heyningen and Weiner (123)
13.	Atmosphere pressure	Increases with increasing atrospheric pressure	Buettner (12)

TABLE AVIII.8

LITERATURE REVIEW OF STUDIES CONCERNING
MEASUREMENT OF SWEAT OSMOLARITY
(Total Osmolarity, Δ fp(°C)* or mOsm/L**)

Mean	Range	Reference	Comment
-.32°* 172**		Schwenkenbecher (104) calculated from Harnack (28)	T. Osm. calculated from Δ fp
-0.27° 145	-0.10 to -0.44° 54- to 237	Mairet and Ardin-Delteil (72, 73, 74, 75)	T. Osm. calculated from Δ fp
-0.31° 167	-0.26 to -0.36° 140 to 194	Strauss (110)	T. Osm. calculated from Δ fp
-0.27° 145	-0.08 to -0.46° 43 to 247	Wurtz, cited by Kopaczewski (55)	T. Osm. calculated from Δ fp
-0.46 247	-0.28 to -0.65 151 to 350	Marchionini (76)	T. Osm. calculated from Δ fp
-0.29° 156	-0.24 to -0.34 129 to 183	Bogdan, cited by Kopaczewski (55)	T. Osm. calculated from Δ fp
229	125.0 to 329	Van Heyningen (120)	T. Osm. calculated from Δ fp, didn't give Δ fp values
123	54 to 174	Amatruda and Welt (4)	Calculated: T. Osm. = 2 (Na) + (K) + (NH_3) + (Urea)
-0.08	-0.03 to -0.20 48 to 123	Lichton (64)	T. Osm. calculated from Δ fp; used sucrose standards and collected only forearm sweat
-0.30° 164	-0.09 to -0.70 51 to 374	Johnson et al. (45)	T. Osm. obtained directly by Fiske Thermistor (NaCl Standards); Δ fp calculated from T. Osm.

* Δ fp means depression of the freezing point of the solution with a calibrated thermometer compared against distilled water.

** mOsm/L means milliosmols per liter; see definition #6.

noticeable lack of material concerning the physical properties of sweat. This report will discuss the relation of one of these physical properties - osmolarity, as determined by freezing point depression - - to its osmotically active components. The fundamental question is, with direct measurement of sweat osmolarity - - by freezing point depression - - is there a relation between the total osmolarity and the known chemical constituents of sweat?

Only nine studies concerning sweat osmolarity have been published (Table AVIII.8). Seven of these investigators actually measured freezing point depression - - Mairet and Ardin-Delteil (72, 73, 74, 75); Strauss (110); Wurtz (55); Marchionini (76); Bogdan (55); Van Heyningen (120); and Lichton (64). Two workers calculated the osmolarity from concentrations of various chemical constituents. Schwenkenbecher (104) calculated freezing point depression from data published by Harnack (28), but did not give the formula used. Armatruda and Welt (4) calculated sweat osmolarity as follows:

Total Sweat Osmolarity = 2 [(Na) + (K) + (NH_3)] + (Urea). We shall show that total sweat osmolarity cannot be estimated accurately when this parameter is calculated from the sum of osmotically active constituents. Furthermore, it is possible to demonstrate that with varying intakes of salt, the total osmolarity of sweat may decrease, increase, or remain constant (101). These relationships may be either inverse or direct, indicating another, perhaps important, factor in the regulation of sweat osmolarity aside from the concentrations of the individual sweat solutes.

To avoid ambiguity of terms the following definitions will be used throughout this report:

1. Molality. The concentration of a solution expressed in mols of solute per 1000 gm of solvent, i.e., one gram molecular weight added to one kilogram of solvent (24).

2. Molarity. The concentration of a solution expressed in mols of solute per 1000 ml of final solution, i.e., one gram molecular weight contained in 1000 ml of final solution (24).

3. Osmotic Pressure. The potential force exerted by dissolved substances resulting from the molecular attraction between solute and solvent in solution. It is proportional to the concentration of molecules in solution and to the lowering of the freezing point. According to the Van't Hoff theory, dissolved substances obey the gas laws, and, therefore, osmotic pressure equals that gas pressure which the solute would exert if all the solvent were removed and the solute left in the same space in the condition of an ideal gas (24).

4. Osmolality. The osmotic strength of a molal solution of an ideal non-electrolyte. This report deals entirely with water as the solvent. The colligative properties are a direct measure of this osmotic strength. Therefore, it is the osmotic pressure exerted by a molal concentration of an ideal non-electrolyte. The osmotic pressure exerted by a molal solution of an

electrolyte is obtained by the following:

$$\text{Osmolality} = \text{Osmotic pressure} = iC$$

Where C = molality and i = ionization or dissociation constant. This constant is obtained by the comparison of the electrolyte to an ideal non-electrolyte of the same concentration to determine the capability of the electrolyte dissociate at that concentration and only that concentration.

$$i = \frac{T}{T^*} = \frac{P}{P^*}$$

Where T = freezing point of an electrolyte, T^* = freezing point of an ideal non-electrolyte, P = osmotic pressure of an electrolyte, and P^* = osmotic pressure of an ideal non-electrolyte "i" values for electrolytes may be found in the International Critical Tables, Vol. IV (32). Osmolality is, therefore, a measure of the concentration of particles in solution of a specific molal concentration of either an ideal non-electrolyte or an electrolyte, or a mixture of both.

5. Osmolarity. The same definition as #4, except the concentration is prepared on a molar instead of a molal basis.

6. Milliosmol per liter (mOsm/L). The osmotic pressure exerted by one-thousandth of a molar solution, in relation to definition #4.

7. Total Osmolarity (T Osm.). That osmolarity of sweat determined experimentally from freezing point depression either by a Beckmann thermometer or a thermistor device (Fiske Osmometer). This value is a measurement of all osmotically active substances in the sample measured as compared against NaCl standards.

The importance of more studies concerning the physical properties of sweat is evident when one considers the information concerning kidney function accumulated from studies of the physical properties of urine. An example is a general theory concerning water regulation from studies of the osmotic regulation mechanisms of the kidney (see Volume I). If physiologists are to define exactly the functions of the eccrine sweat gland, systematic studies comparable to those of renal physiologists are necessary. Only two such studies are found in the literature - - Van Heyningen (120) and Lichton (64); both of these studies, while basic, have faults which will be discussed later in this report.

We have conducted a third systematic study. Three significant observations were made: (1) That if each solute is calculated as percent of the total osmolarity, the percentage sum of the major osmotically active solutes does not equal or even approximate the total osmolarity of sweats with high osmolarities. There is an osmotic deficit. This deficit may be as great as 50% of the total osmolarity. (2) That the sum of the measured major cations, i.e., sodium, potassium, and ammonia (mEq/L), exceeds the sum of

the measured major anions, i.e., lactate and chloride (mEq/L). We believed that this ionic imbalance is directly related to the above mentioned deficit, showing that this substance or these substances are charged negatively, and indicating a possible organic acid with a moderately high pK value. (3) That this is not a substance or substances previously studied in sweat. Study of Tables AVIII.1 through AVIII.6 indicates that none of the individual solutes equal this deficit, nor do the cumulative sums of the non-major constituents found in those tables equal this deficit. These three observations are the main subjects of this report.

B. METHODS

The methods used in our study of sweat have been described in detail in Appendix II, Section D.

C. RESULTS

This report is primarily concerned with the quantitative data collected during the 1955 summer test. A summary of the results of these investigations is shown in Table AVIII.9. The major constituents of sweat are recorded in two units of concentration, mEq/L (ionized solutes) or mMol/L (unionized solutes) and in percent of total osmolarity (% T.Osm.). The latter value was calculated for each individual specimen and will be discussed subsequently in more detail.

Total Osmolarity. The mean total osmolarity of sweat (Table AVIII.9) is 162.62 mOsm/L, ranging from 51 to 374 for the experimental group and 110.21 mOsm/L, ranging from 69 to 194 for the control group. Figure AVIII.1 illustrates the frequency distribution of total osmolarity for both experimental and control groups. When the experimental and control groups were compared statistically, it was found that the mean values were significantly different ($t = 8.93$, $P < 0.01$). These data are in good agreement with the results of previous investigators who directly measured osmolarity (Table AVIII.8). The osmolarity of sweat is usually hypotonic to serum. The mean serum osmolarity was 286 mOsm/L (46). In a few samples (20%) the sweat osmolarities were either isotonic (15% of the samples) or hypertonic (5% of the samples) to the serum osmolarities.

Sodium. The values of sodium in sweat ranged from 11 to 99 mEq/L with a mean of 35.54 mEq/L for the experimental group. The range and mean for the control group were from 11 to 63 mEq/L and 23.40 mEq/L, respectively. A frequency distribution of the sodium values, in mEq/L, for the two groups is shown in Figure AVIII.1. The two groups were found to be significantly different ($t = 8.22$, $P < 0.01$).

Calculating sodium as % T.Osm., the mean value for the experimental group was 25.31%, with a range from 10 to 46%; for the control group the mean was 24.12%, ranging from 12 to 40% (Figure AVIII.2). Comparing these two groups statistically no significant difference was found ($t = 1.21$, $P < 0.50$). The correlations of sodium in units of mEq/L and % T.Osm. to the total osmolarity are +0.630 and -0.084, respectively, for the experimental group. For the control group, the correlations are +0.744 in mEq/L and +0.352 in % T.Osm. when correlated with total osmolarity. These values are shown in Tables AVIII.10 and AVIII.11. The sodium values for controls are in complete accord with results of all previous investigators (in units of mEq/L, Table AVIII.1); in all cases sodium values in sweat are hypotonic to sodium values in serum - - 135 mEq/L (47).

Potassium. Potassium values were found to range from 5.0 to 32.0 mEq/L with the mean value being 11.74 mEq/L for the experimental group. The con-

TABLE AVIII.9

STATISTICAL DATA: SUMMARY OF EXPERIMENTAL AND CONTROL GROUPS OF ALL PERIODS

	PRE-PERIOD* (Normal Food and Water) Week I	Week II	EXPERIMENTAL* (Exp. Regimens) Week I	RECOVERY PERIOD* (Normal Food and Water) Week I	Week II	All Weeks	Controls
			Total Osmolarity				
$\bar{X}$	149.20	179.73	179.09	161.70	148.97	162.62	108.46
Range	51-304	85.374	66-341	92-339	87-278	51-374	69-194
Mode	------	------	------	------	------	144.73	96.40
S.D.	------	------	------	------	------	±49.97	±23.99
N	79	78	78	71	68	374	54
			Sodium (mEq/L)				
$\bar{X}$	37.66	50.05	35.44	45.66	37.21	41.19	27.42
Range	15-82	17-92	13-67	17-99	11-92	11-99	11-63
Mode	------	------	------	------	------	35.54	23.40
S.D.	------	------	------	------	------	±16.26	±11.52
N	79	78	78	71	68	374	54
			Sodium (% of T. Osm.)				
$\bar{X}$	25.88	28.39	20.54	27.75	24.86	25.61	24.72
Range	12.45-	14-43	10-46	13-39	12-44	10-46	12-40
Mode	------	------	------	------	------	25.31	24.12
S.D.	------	------	------	------	------	±7.35	±6.72
N	79	78	78	71	68	374	54
			Potassium (mEq/L)				
$\bar{X}$	11.82	12.20	13.87	10.32	11.08	11.74	8.48
Range	4-26	6-29	7-32	7-27	6-18	4-32	4-19
Mode	------	------	------	------	------	9.77	8.40
S.D.	------	------	------	------	------	±4.04	±2.22
N	79	78	78	71	68	374	54

* For further clarification, see Sargent, Johnson, and Sargent (101)

TABLE AVIII.9 (Contd)

	Week I	Week II	Week I	Week I	Week II	All Weeks	Controls
			Potassium (% of T. Osm.)				
$\bar{X}$	8.19	6.71	8.16	6.48	7.54	7.42	8.09
Range	3-14	3-11	4-14	4-10	4-13	3-14	3-13
Mode	------	------	------	------	------	7.88	8.57
S.D.	------	------	------	------	------	±1.97	±2.09
N	79	78	78	71	68	374	54
			Chloride (mEq/L)				
$\bar{X}$	32.36	42.55	34.49	45.37	33.64	37.60	26.01
Range	13-73	13-84	10-67	16-100	11-88	10-100	11-63
Mode	------	------	------	------	------	29.60	24.30
S.D.	------	------	------	------	------	±14.68	±10.15
N	79	78	78	71	68	374	54
			Chloride (% of T. Osm.)				
$\bar{X}$	22.27	24.23	19.88	27.93	22.54	23.44	23.78
Range	13-37	9-37	11-38	15-39	12-37	9-39	12-40
Mode	------	------	------	------	------	24.01	23.61
S.D.	------	------	------	------	------	±6.66	±6.28
N	79	78	78	71	68	374	54
			Urea (mMol/L)				
$\bar{X}$	16.87	18.64	23.81	17.00	20.24	19.25	14.79
Range	7-27	9-33	10-33	8-31	11-31	7-33	8-23
Mode	------	------	------	------	------	17.33	14.70
S.D.	------	------	------	------	------	±5.74	±3.39
N	79	78	78	71	68	374	54
			Urea (% of T. Osm.)				
$\bar{X}$	11.96	10.63	14.41	10.90	13.96	12.35	14.22
Range	6-18	6-19	8-27	6-19	8-23	6-27	7-23
Mode	------	------	------	------	------	12.50	14.00
S.D.	------	------	------	------	------	±3.46	±3.66
N	79	78	78	71	68	374	54

TABLE AVIII.9 (Contd)

	Week I	Week II	Week I	Week I	Week II	All Weeks	Controls
			Ammonia (mEq/L)				
$\bar{X}$	8.44	9.32	11.91	8.54	10.14	9.64	7.40
Range	3-14	4-17	5-17	4-16	6-16	3-17	4-11
Mode	------	------	------	------	------	8.84	7.50
S.D.	------	------	------	------	------	±2.87	±1.70
N	79	78	78	71	68	374	54
			Ammonia (% of T. Osm.)				
$\bar{X}$	6.08	5.32	7.19	5.39	7.01	6.16	7.02
Range	3-9	3-9	4-13	3-9	4-11	3-13	3-11
Mode	------	------	------	------	------	7.39	7.50
S.D.	------	------	------	------	------	±1.74	±1.87
N	79	78	78	71	68	374	54
			Lactic Acid (mEq/L)				
$\bar{X}$	21.76	19.68	19.93	18.18	20.33	19.97	16.66
Range	5-34	5-34	2-34	3-34	5-34	2-34	2-34
Mode	------	------	------	------	------	-20.85	11.50 & 18.10
S.D.	------	------	------	------	------	±7.76	±6.64
N	79	78	78	71	68	374	54
			Lactic Acid (% of T. Osm.)				
$\bar{X}$	15.07	11.65	12.83	11.89	14.10	13.21	15.65
Range	4-31	4-23	2-32	2-24	3-25	2-32	2-30
Mode	------	------	------	------	------	14.13	12.80 & 21.23
S.D.	------	------	------	------	------	±5.42	±6.18
N	79	78	78	71	68	374	54
			pH				
$\bar{X}$	5.01	4.98	4.69	4.66	4.79	4.83	4.94
Range	4-6	4-6	4-6	4-6	4-6	4-6	4-6

TABLE AVIII.9 (Contd)

	Week I	Week II	Week I	Week I	Week II	All Weeks	Controls
Lactate (mEq/L)							
$\bar{X}$	20.28	17.44	16.83	15.39	17.89	17.57	17.16
Range	5-32	5-32	2-32	3-32	5-32	2-32	2-32
N	79	78	78	71	68	374	54
Σ of Constituents (mOsm/L)							
$\bar{X}$	134.65	157.82	149.68	146.45	133.88	144.84	102.63
Range	56-187	73-192	70-217	95.275	80.209	56-275	90-129
N	79	78	78	71	68	374	54
Σ of Constituents (%)							
$\bar{X}$	90.25	87.81	83.58	90.57	89.87	88.22	93.02
Range	53-110	60-103	57-109	76-107	66-110	53-110	69-105
Mode	------	------	------	------	------	91.21	95.65
S.D.	------	------	------	------	------	±11.82	±9.36
N	79	78	78	71	68	374	54
Σ of Cations = ($Na^+ + K^+ + NH_4^+$)							
$\bar{X}$	57.60	70.35	60.18	64.77	58.37	62.31	43.68
Range	22-122	27-138	26-116	28-142	23-126	22-142	20-93
N	79	78	78	71	68	374	54
Σ of Anions = (Cl^- + Lactate$^-$)							
$\bar{X}$	52.64	59.99	51.32	60.76	51.53	55.24	43.09
Range	18-105	18-116	12-99	19-132	16-120	12-132	13-94
N	79	78	78	71	68	374	54
Σ of Cations - Σ of Anions							
X	+ 4.99	+10.27	+8.92	+3.96	+6.84	+7.06	+0.58
Range	-12 to +29	-13 to +40	-14 to +29	-24 to +28	-13 to +32	-24 to +40	-11 to +17
N	79	78	78	71	68	374	54

trols ranged from 4.5 to 19.0 mEq/L with a mean of 8.48 mEq/L. The mean value and range of potassium for the control group are in agreement with similar values of potassium determined by earlier workers (Table AVIII.1). Potassium in sweat is usually hypertonic to serum potassium - - 4.4 mEq/L (47).

Figure AVIII.1 shows a frequency distribution of these values for potassium in the experimental and control groups. Upon comparing these two groups they were found to be significantly different ($t = 7.02$, $P < 0.01$). The values calculated as % T.Osm. range from 3 to 14% for the experiment group and 3 to 13% for the control group. The mean values for the experimental and control groups were 7.42% and 8.09% respectively (Figure AVIII.2). Statistical comparison of the mean values revealed no significant difference between the two groups ($t = 2.23$, $P > 0.30$). Tables AVIII.10 and AVIII.11 show multicorrelation values for the correlations in mEq/L units in % T.Osm. units for the experimental and control groups.

Chloride. This third major solute in sweat has a mean value of 37.60 mEq/L with a range from 10 to 100 mEq/L for the experimental group, and has the respective dimensions of 26.01 mEq/L and from 11 to 63 mEq/L for the control group. Figure AVIII.3 shows the frequency distribution of the individual chloride values from these two populations which statistically are different ($t = 7.55$, $P < 0.01$). These data when calculated as % T.Osm. have a mean value of 23.44%, ranging from 9 to 39% for the experimental group and have a mean value of 23.78% ranging from 12 to 40% for the control group. Figure AVIII.2 shows the mean values and the ranges for all of the major solutes in sweat in units of % T.Osm. (This figure will be discussed in greater detail later in this section.) A comparison of the means, % T.Osm., statistically yields no significant difference ($t = 0.37$, $P > 0.50$). Tables AVIII.10 and AVIII.11 show the correlations of chloride to the total osmolarity, sodium, and potassium in mEq/L and % T.Osm., respectively. Our observations on chloride values for the control group are in agreement with all investigators except those reported by Mosher (84) and Van Heyningen (120), see Table AVIII.2. Both Mosher and Van Heyningen report values which are hypertonic to serum chloride - - 102 mEq/L (47). All other investigators listed in Table AVIII.2 report chloride values which are usually hypotonic, or rarely isotonic, to chloride in serum (47).

Urea. The observed values for the mean and range for urea were 19.25 mMol/L and from 6.57 to 33.46 mMol/L for the experimental group, and 14.79 mMol/L and from 8.57 to 22.63 mMol/L for the control group. Figure AVIII.3 illustrates the frequency distribution of these two groups. Comparing their means by the "t" test it was observed that the two groups were from two different populations ($t = 7.91$, $P < 0.01$). These data calculated as % T.Osm. have a mean value of 12.35% with a range from 6 to 27% for the experimental group and a mean value of 14.22% with a range from 7 to 23% for controls, Figure AVIII.2. The statistical comparison of the mean values from these data calculated in % T.Osm. shows no significance between the two groups ($t = 3.528$, $P > 0.05, < 0.10$). The correlation values can be found in Tables AVIII.10 and AVIII.11. The urea data presented in this report for the control group are, although slightly higher in most cases, in agreement with those of previous investigators shown in Table AVIII.4. Sweat urea is usually hypertonic to serum urea, 6.61 mMol/L (47).

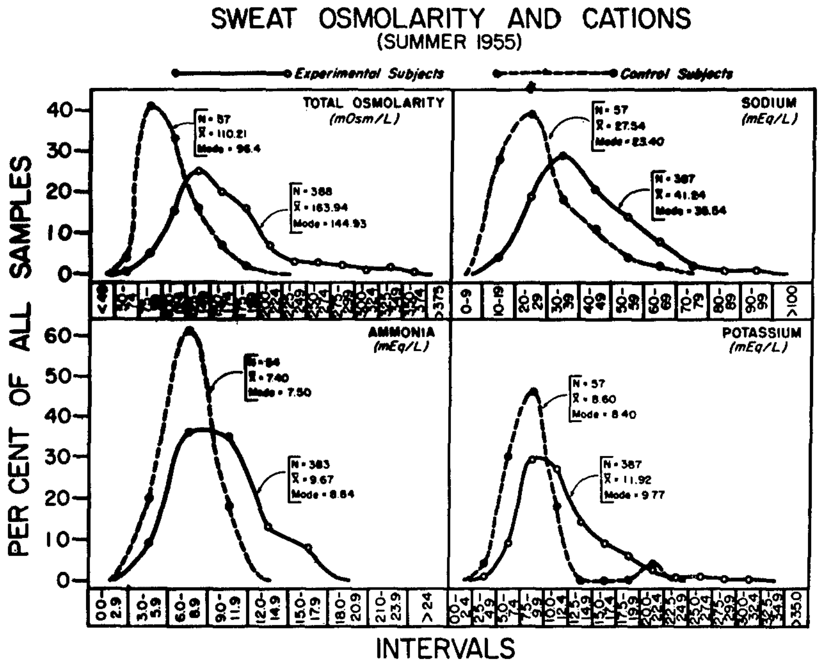

FIGURE AVIII.1 SWEAT OSMOLARITY AND CATIONS.

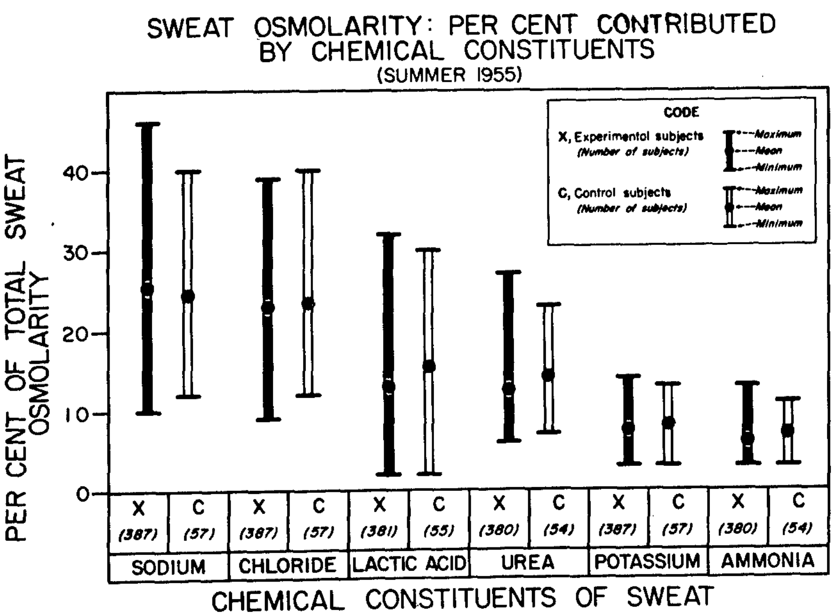

FIGURE AVIII.2 SWEAT OSMOLARITY: PER CENT CONTRIBUTED BY CHEMICAL CONSTITUENTS

TABLE AVIII.10

CORRELATION OF MAJOR CONSTITUENTS OF SWEAT WITH EACH OTHER: CONCENTRATION
(Data calculated by the Illiac using program K-2-135, i.e., multicorrelation with analysis of variance, analysis of co-variance, mean, and standard deviation.)

Constituent	Total Osmolarity (mOsm/L)	Sodium (mEq/L)	Potassium (mEq/L)	Chloride (mEq/L)	Urea (mMol/L)	Ammonia (mEq/L)	Lactic Acid (mEq/L)
Experimental Subjects (374 specimens)							
Total Osmolarity	------	0.630	0.640	0.606	0.550	0.554	0.204
Sodium	0.630	------	0.009	0.931	-0.021	-0.016	0.011
Potassium	0.640	0.009	------	-0.040	0.654	0.656	0.366
Chloride	0.606	0.931	-0.040	------	-0.013	-0.008	-0.038
Urea	0.550	-0.021	0.654	-0.013	------	0.999	0.118
Ammonia	0.554	-0.016	0.656	-0.008	0.999	------	0.120
Lactic Acid	0.204	0.011	0.366	0.038	0.118	0.120	------
Control Subjects (54 specimens)							
Total Osmolarity	------	0.744	0.340	0.650	0.289	0.289	0.294
Sodium	0.744	------	-0.187	0.936	-0.171	-0.171	0.033
Potassium	0.340	-0.187	------	-0.326	0.640	0.640	0.414
Chloride	0.650	0.936	-0.326	------	-0.242	-0.242	-0.088
Urea	0.289	-0.171	0.640	-0.242	------	1.000	-0.288
Ammonia	0.289	-0.171	0.640	-0.242	1.000	------	0.288
Lactic Acid	0.294	0.033	0.414	-0.088	-0.288	0.288	------

TABLE AVIII.11

CORRELATION OF MAJOR CONSTITUENTS OF SWEAT WITH EACH OTHER: PER CENT TOTAL OSMOLARITY
(Data calculated by the Illiac using program K-2-135,
i.e., multicorrelation with analysis of variance,
analysis of co-variance, mean, and standard deviation.)

Constituent	Total Osmolarity (mOsm/L)	Sodium (% T.Osm.)	Potassium (% T.Osm.)	Chloride (% T.Osm.)	Urea (% T.Osm.)	Ammonia (% T.Osm.)	Lactic Acid (% T.Osm.)	Σ of Constituents (% T.Osm.)
Experimental Subjects (374 specimens)								
Total Osmolarity	-----	-0.084	-0.312	-0.116	-0.422	-0.413	-0.471	-0.571
Sodium	-0.084	-----	-0.606	0.860	-0.532	-0.526	-0.202	0.682
Potassium	-0.312	-0.606	-----	-0.629	0.565	0.562	0.468	-0.099
Chloride	-0.116	0.860	-0.629	-----	-0.496	-0.492	-0.220	0.676
Urea	-0.422	-0.532	0.565	-0.496	-----	0.980	0.264	0.044
Ammonia	-0.413	-0.526	0.562	-0.492	0.980	-----	0.268	0.048
Lactic Acid	-0.471	-0.202	0.468	-0.220	0.264	0.268	-----	0.406
Σ of Constituents	-0.571	0.682	-0.099	0.676	0.044	0.048	0.406	-----
Control Subjects (54 specimens)								
Total Osmolarity	-----	0.352	-0.483	0.140	-0.540	-0.579	-0.280	-0.265
Sodium	0.352	-----	-0.717	0.852	-0.657	-0.661	-0.354	0.493
Potassium	-0.483	-0.717	-----	-0.708	0.688	0.704	0.354	-0.117
Chloride	0.140	0.852	-0.708	-----	-0.576	-0.583	-0.382	0.520
Urea	-0.540	-0.657	0.688	-0.576	-----	0.983	0.297	0.099
Ammonia	-0.579	-0.661	0.704	-0.583	0.983	-----	-0.340	0.116
Lactic Acid	-0.280	-0.354	0.354	-0.382	0.297	0.340	-----	0.404
Σ of Constituents	-0.265	0.493	-0.117	0.520	0.099	0.116	0.404	-----

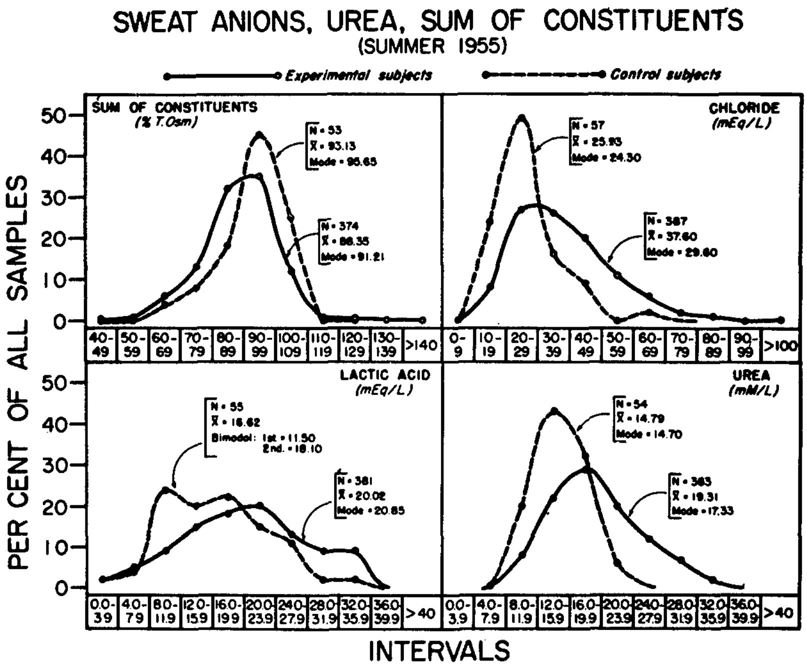

FIGURE AVIII.3. SWEAT ANIONS, UREA, SUM OF CONSTITUENTS.

Ammonia. The values of ammonia in sweat (Figure AVIII.2) ranged from 3.29 to 16.73 mEq/L with a mean value of 9.64 mEq/L for the experimental group. For the control group the mean was 7.40 mEq/L with a range from 4.29 to 11.32 mEq/L. Figure AVIII.1 presents a frequency distribution of these ammonia values for both the experimental and control groups. These groups were found to be statistically different ($t = 8.54$, $P < 0.01$). The values of ammonia in sweat calculated at % T.Osm. have a mean value of 6.16% and ranged from 3 to 13% for the experimental group; the mean value for the control group was 7.02% with a range from 3 to 11%. A statistical comparison of the mean values shows no significant difference between the two groups ($t = 3.31$, $P > 0.10$). Tables AVIII.10 and AVIII.11 show the multiple correlations for sweat ammonia in mEq/L and in % T.Osm., respectively, for both the experimental and control groups. The ammonia values for our controls are in near agreement with those of most previous investigators, being slightly lower. In all cases, ammonia values in sweat are hypertonic to serum ammonia - - 3.37 mEq/L (101).

Lactic Acid. The last major constituent determined at this laboratory was lactic acid. The mean and range for the experimental group were 19.97 mEq/L and from 2.0 to 33.9 mEq/L, respectively. The mean value was 16.66 mEq/L and ranged from 2.5 to 33.5 mEq/L for the control group. These two

groups were not statistically different ($t = 3.36$, $P > 0.05$), the only major solute of sweat that is not significantly different when two groups are compared. A plot of the individual values is shown as a distribution curve in Figure AVIII.1. Calculation of the lactic acid values as % T.Osm. yields a mean value of 13.21%, ranging from 2 to 32% for the experimental group; and a mean value of 15.65%, ranging from 2 to 30% for the control group (Figure AVIII.2). Tables AVIII.10 and AVIII.11 contain the correlations of lactic acid with the other measured moieties, in units of mEq/L and % T.Osm., respectively. Our mean lactic acid values are in agreement with those of some, but not with all, of the previous investigators. The range of the control group is in very good agreement with the previous literature (Table AVIII.3).

Creatinine. The mean and range values are not presented in Table AVIII.9 because creatinine is not important as a major sweat constituent. They are, however, found in Table AVIII.4. The mean value of creatinine in sweat was found to be 0.07 mMol/L in the experimental subjects, with a range from 0.01 to 0.38 mMol/L. The values for the control subjects were 0.07 mMol/L and from 0.00 to 0.16 mMol/L. These data are in complete agreement with all previous workers.

Total Ketone Bodies. Similarly to creatinine this solute is not found in Tables AVIII.9, AVIII.10, or AVIII.11 because it does not contribute significantly osmotic activity of sweat. The mean value for the experimental group was 0.57 mMol/L with a range from 0.08 to 2.05 mMol/L. The control group had a mean value of 0.35 mMol/L and ranged from 0.08 to 1.60 mMol/L (Table AVIII.5).

This solute has not been measured in sweat by any other laboratory; these data are, therefore, unique in the study of sweat chemistry and physiology.

Multiple Correlations. From Table AVIII.10 one may observe the following:

1. That sweat osmolarity is not substantially correlated to any single solute. It is correlated least to sweat lactic acid.

2. That only sodium and chloride have good correlation, 0.936 (ammonia to urea is an auto-correlation; see Methods in Appendix II, Section D).

These results will be discussed further in the following section.

Sum of Constituents. In this report the various ionizable solutes were not corrected for degree of ionization. Sweat is a highly heterogenous solution in which the anion-cation combinations are not fully known. Although individual solutes in sweat may be hypertonic, hypotonic, or isotonic to those in serum, the sum of these individual solutes in sweat is usually hypotonic, in some instances isotonic, to the osmolarity of serum.

The mean value was 144.84 mOsm/L, ranging from 56 to 275 mOsm/L for the experimental group. The mean value for the control group was 102.63 mOsm/L; the range was from 90 to 129 mOsm/L. The sum of the various constituents when each was calculated as % T.Osm. ranged from 53 to 110% for the experimental subjects with a mean value of 88.22%. For the control subjects, the mean value was 93.02% and ranged from 69 to 105%. The sum of the constituents as percent has a linear relation to the total osmolarity; the slope of this function is -0.1351 for the experimental group with a correlation coefficient of -0.571. This measurement for the control group had a linear relation with total osmolarity with a slope of the line being -0.1034, a correlation coefficient of -0.265. The correlation coefficient shows that a linear function is not the best fit for the relation of percentage sum of the individual solutes.

Study of the data indicates that as the sweat becomes more concentrated, the percentage deficit increases; i.e., that the sum of the major constituents does not account for 90% of the total osmolarity when the concentration is high as it does for osmolarities of lower concentration. This deficit may be as large as 50% of the total osmolarity. Figure AVIII.4 shows a scatter graph of the individual total osmolarities plotted against the % sum of the major constituents. Speculation regarding this unknown substance or substances will be discussed later in this report.

Sum of Cations. Upon adding the measured cations (sodium, potassium, and ammonia) the observed mean value was 62.31 mEq/L and the range was from 22 to 142 mEq/L for the experimental group; the mean value for the control group was 43.68 mEq/L and the range was from 20 to 93 mEq/L, Table AVIII.9).

Sum of Anions. The addition of the measured anions (chloride and lactate) gave a mean value for the experimental group of 55 mEq/L with a range from 12 to 1132 mEq/L. The mean value and range for the control group (Table AVIII.9) were 43.09 mEq/L and 13 to 94 mEq/L, respectively.

Sum of Cations minus Sum of Anions. It was observed that if the sum of the measured anions was subtracted from the sum of the major cations, the cations in most cases were in excess. The mean of this difference for the experiment group was +7.06 mEq/L, and values ranged from -24 mEq/L to +40 mEq/L. Similar results were found for the control subjects, the mean value being +0.58 mEq/L and the range, -11 to +17 mEq/L. This electrolytic imbalance is in complete disagreement with the observations of Dill, Hall, and Edwards because the addition of ammonia to the sum of the cations would cause the sum of the measured cations to exceed the sum of the measured anions. The addition of calcium values would only shift the electrolytic imbalance toward a greater positivity. Study of Table AVIII.2 will show that no anion, other than chloride, is capable of causing neutrality.

A note should be inserted here to explain the decrease in the number of subjects in one period as compared to another period. This decrease was due to the removal of a subject for causes of illness, or inability to remain on a particular diet. The removal of a subject does not affect the values given in this report because of the large total number of subjects studied. For further information consult Sargent, Johnson, and Sargent (101).

D. DISCUSSION

A complete study of the relation of all major constituents of sweat, i.e., sodium, chloride, lactic acid, urea, potassium, and ammonia, to its total osmolarity has not been attempted before this investigation. A survey of the literature verifies this statement, for only three previous partial attempts were made; each, however, did not consider all of the major solutes. The three previous studies attempted were by Van Heyningen (120), Amatruda and Welt (4), and Lichton (64). Amatruda and Welt tried to predict the total osmolarity by using only an equation. We shall show that this method of determining osmolarity is inadequate. Before discussing the equation of Amatruda and Welt, brief consideration should be given to Schwenkenbecher (104). This investigator reports that Harnack (28) observed a freezing point for sweat of $-0.32^{\circ}C$. However, in reviewing the original paper of Harnack, no freezing points of sweat were found. We, therefore, conclude that Schwenkenbecher calculated a freezing point from the data Harnack reported.

TABLE AVIII.12

ANALYSIS OF VARIANCE COMPARING THE OSMOLARITIES OF SWEAT AS DETERMINED BY THE "FISKE" OSMOMETER AND AMATRUDA AND WELT'S EQUATION
(Data calculated by the Illiac)

Treatment Means

a) 161.606
b) 136.596

Analysis of Variance Table

Source of Variation	D/F	Sum of Squares	Mean Squares
Total	197	382218.59	-----
Replicated	98	322820.33	-----
Treatments	1	30962.52	30962.52
Error	98	28435.74	290.17

F-Value. $P = \frac{\text{Treatment N. S.}}{\text{Error M.S.}} = 106.706$, $P < 0.01$

Standard Deviation of the Mean = 1.710
General Mean = 149.101

Amatruda and Welt made a similar mistake. They used the following equation to determine the osmolarity of sweat:

$$\text{Total Osmolarity} = 2\left[(\text{Na}) \pm (\text{K}) + (\text{NH}_3)\right] + \text{Urea}$$

Table AVIII.12 contains the analysis of variance data of sweat samples determined at this laboratory using the "Fiske" Osmometer and using the Amatruda and Welt equation. Ninety-nine specimens were selected at random and the osmolarities were determined by the "Fiske" and by Amatruda and Welt's equation. The mean value for the samples determined by the osmometer (a) was 161.61, and the mean value was 136.60 when using the equation of Amatruda and Welt (b). This analysis shows that there are two distinct populations when determining the osmolarities by these two methods ($F = 106.71$, $P < 0.01$).

The main fault of Amatruda and Welt was that they did not consider that sweat is a highly heterogenous solution, and that each solute is extremely variable within any individual subject from collection to collection. The equation was derived to meet the conditions in serum where the osmolarity and individual constituents remain more constant during an almost indefinite period of time. The degree of fluctuation of sweat osmolarity is not solely dependent on the solute intake, for it has been demonstrated that with varying intakes of solutes the total osmolarity of sweat may decrease, increase, or remain constant (101). This fact causes one to believe that other factors may be important in the regulation of sweat osmolarity, possibly, in part, those shown in Table AVIII.8. This fact is important because the output of certain solutes is reported to be directly related to the amount taken into or formed by metabolism in the body (14, 16, 59, 71, 77, 96, 98, 128).

Van Heyningen (120) reports that the sums of chloride, as sodium chloride, lactate, as sodium lactate, and urea account for 90% to 94% of the osmotic pressure of sweat. Chloride, as sodium chloride, accounts for 79%; lactate, as sodium lactate, for approximately 12%; and urea for about 3%. Upon obtaining Van Heyningen's thesis we were unable to reproduce her original calculations concerning these assumptions. And, although Weiner reported that she measured over 200 osmotic pressures of sweat by freezing point depression (personal communication, 1956), no actual freezing point data were found. The chloride values, reported in mEq/L of chloride (Table AVIII.2) are in complete disagreement with the previous workers in the field and this laboratory. Because of these above mentioned assumptions an equation was constructed on the basis of Van Heyningen's assumptions. It was as follows:

$$2\left[(\mathrm{Cl})(0.90) + (\mathrm{Lactate})(0.98) + (\mathrm{Urea})(0.94)\right] = 90\% \text{ of the total osmolarity of sweat}$$

Note: 0.90 = dissociation constant of Cl, as sodium chloride
0.98 = dissociation constant of lactate, as sodium lactate (102)
0.94 = dissociation constant of urea

These values were obtained from Van Heyningen's thesis (120) and were used to duplicate her conditions.

A statistical analysis was made to check this equation by similar methods used in testing Amatruda and Welt's equation. Fifty-one specimens were

selected randomly and the observed osmolarity was multiplied by 0.90 to achieve 90% of the measured osmolarity. The individual values of constituents, chloride, lactate, and urea, were corrected according to the equation given on the previous page. Table AVIII.13 summarizes an analysis of variance of these data when compared as two different treatments. Treatment (a), the measured osmolarity multiplied by 0.90, has a mean value of 146.80; treatment (b), using Van Heyningen assumptions, has a mean value of 120.55. Comparing these treatments means we observed that they were significantly different ($F = 22.32$, $P < 0.01$). Here again it is shown that sweat osmolarity cannot be calculated or assumed because of the relation of certain solutes to the total osmolarity. Observation of Figure AVIII.4 will bring out that as osmolarity increases, the per cent sum of the constituents decreases, the slope of this linear relation being - 0.1490 for the experimental group. Therefore, the same fallacies must be contained in the assumptions of Van Heyningen as were contained in those of Amatruda and Welt. Sweat is a highly heterogenous solution and no general concepts may be developed until more work is done concerning the physical properties of sweat and the physics of the sweat gland.

TABLE AVIII.13

ANALYSIS OF VARIANCE TESTING THE CONCLUSIONS OF VAN HEYNINGEN*
(using the data observed at this laboratory)

Treatment Means

a) 146.80
b) 120.55

Analysis of Variance Table

Source of Variation	D/F	Sum of Squares	Mean Squares
Total	101	228475.00	-----
Replicated	50	171349.50	-----
Treatments	1	17630.21	17630.21
Error	50	39495.29	789.91

F-Value. $P = \frac{\text{Treatment M. S.}}{\text{Error M. S.}} = 22.32$, $P < 0.01$

General Mean = 131.70

* Van Heyningen assumed that chloride, as sodium chloride, lactate, as sodium lactate, and urea accounted for 90% of the total osmolarity; therefore, all observed data from this laboratory were multiplied by the factor 0.90. Also, each constituent was corrected for its activity according to the specifications of Van Heyningen's thesis (120).

An important principle that is necessary to be explained before any general concept is developed is the approximate 1:1 (1.05:1) relation between sodium and chloride in sweat. This is the only biological fluid or excretion where this particular ratio between sodium and chloride consistently is observed: serum, 1.32:1; urine widely variable, from 0.81 to 1.07 for ideal controls (47); tears, 1.13:1; saliva, 1.12:1; lymph, 1.22:1; cerebrospinal fluid, 1.84:1, prostatic fluid, 4.03:1; seminal plasma, 2.72:1; etc. (109). This was the important factor that both Amatruda and Welt (4) and Van Heyningen (120) did not consider in their assumptions of sweat osmolarity. Amatruda and Welt based their equation on serum.

A second consideration is that of correlations. In Table AVIII.10 one may observe that no good correlation between any major solute and total sweat osmolarity exists. This lack of correlation suggests that it is fallacious to design a general equation to calculate total sweat osmolarity from a few individual solutes.

The third previous study of this nature was the investigation of Lichton (64). This worker observed two important features in sweat from one subject: (1) that sweat osmolarity is always hypotonic to serum and (2) that there is no consistent relation between the chemical composition of sweat and the chemical composition of blood serum. Although Lichton's sweat osmolarity was always hypotonic to the osmolarity of serum, analysis of Table AVIII.8 indicates that sweat osmolarity is extremely variable, ranging from hypotonicity to isotonicity when compared with blood serum. A few of our specimens (approximately 5% of all specimens) were found to be even slightly hypertonic to the osmolarity of serum. However, in all previous studies (Table AVIII.8) the mean osmolarity of sweat samples is always hypotonic to the mean osmolarity of serum.

Lichton collected his specimens with the use of a cuff, an obstetrical rubber glove with the hand portion removed. Because of this difference and because of his low osmolarities, an experiment was designed to test if forearm sweat is significantly different from sweat collected from the forearm and hand combined as it was collected from our experimental subjects. The experimental design was planned to test three factors. They were as follows:

1) To test the difference between forearm sweat and forearm plus hand sweat, i.e., mode of collection.

2) To test if Lichton's specimens, using one subject, were different from those collected from our control group.

3) To test the validity of the samples collected at this laboratory. Because of freezing and the length of time they remained frozen before analyses could be completed, the possibility existed that they may have slightly decomposed during this period of time.

The experimental routine was as follows:

Experimental Routine

Subjects by order:	Subject No.
1. I.L.	1
2. N.M.	2
3. G.W.	3

1. All subjects must shave arms to elbow Friday night, before 8:00 P.M. (2000 hours).

2. Subject #1 reports at 0730, dresses.

3. Subject washes right arm in distilled H_2O, dries with paper towels and puts on rubber glove.

4. Subject warms up on bike 0740-0750, without arm cuff, with complete glove on right arm.

5. 0750-0800, subject voids urine, weighs on clinical scale, and drinks 200 ml of lukewarm H_2O (distilled H_2O).

6. Subject washes left arm in distilled water, dries with paper towels and puts on rubber cuff.

7. 0800-0825, subject pedals in period A. In period B the subject again pedals on bike, in period C he will step once every two seconds on and off a 10.00-in. box, and during period D he will sit quietly; at the pre-arranged times. Subject #2 and #3 will follow this routine during their various periods.

8. 0825-0835, sits quietly.

9. 0835-0900, works again according to prescribed conditions in #7.

10. 0900, removes gloves.

11. Volume of sweat measured separately from both arms, and is placed in bottles according to sample.

12. Denotation of samples (bottle labels):

    (a) Subject No., period, arm
    example 2 , B , L (Left)

    (b) Data recorded.

    (c) Samples quickly frozen in dry-ice.

13. Glove and cuff will alternate between the two arms during the various periods.

14. Subject B reports at 0900; subject C reports at 1030.

15. Times of reporting during periods:

Subject No.	Day	Time to Report
1	11/10	0730
2	Morning	0830
3		0930
1	Afternoon	1400
2		1500
3		1600
1	11/11	0900
2	Morning	0900
3		0900
1	Afternoon	1400
2		1500
3		1600

The environmental conditions were hot, moist heat (D.B. = 93 ± 0.5°F, W.B. = 84 ± 1.0°F, and 70% R.H.). Reading of the environment were taken every 15 minutes.

Tables AVIII.14 and AVIII.15 summarize the results of the experiment. From these data, it was observed that Lichton was not unlike our control group regarding the total osmolarity of sweat, although he fell on the left side of the control mean value. These results completely disagreed with his thesis until a small methodological error was detected (Lichton, personal communication, 1957). The re-evaluation of his original data corrected for the previous error resulted in our complete agreement.

We observed that cuff work sweat, i.e., only forearm, is not completely dissimilar to total forearm and hand work sweat in the quantities of various solutes, although having a slightly lower osmolarity (Table AVIII.14). Work sweat denotes sweat collected from an individual during some physical exercise (experiments A, B, and C). When each constituent was calculated as the percent of total osmolarity, it was observed that the sum of the constituents as % T.Osm. had an average value of 98.44% for work sweat collected only from the cuff for all subjects, and a mean value of 90.61% for work sweat collected from the glove for all subjects. Comparing these means statistically a significant difference was found ($t = 2.38$, $P < 0.05$, $P > 0.01$). Another

TABLE AVIII.14

CHEMICAL COMPOSITION OF SWEAT: GLOVE SWEAT COMPARED WITH CUFF SWEAT FROM DIFFERENT SUBJECTS

Subject 1 (I. L.)

Constituent	Conditions, Samples, and Arms							
	Bicycle 1		Bicycle 2		Stepping		Sitting	
	Glove (RH)	Cuff (LH)	Glove (LH)	Cuff (RH)	Glove (RH)	Cuff (LH)	Glove (RH)	Cuff (LH)
Total Osmolarity (mOsm/L)	82.0	66.5	92.0	69.0	96.0	62.0	110.0	68.0
Lactic Acid								
(mEq/L)	13.9	8.9	13.4	9.8	13.9	8.7	18.3	11.4
(% T.Osm.)	16.9	13.4	15.8	14.2	14.5	14.3	16.6	16.8
pH	6.8	7.3	6.3	7.3	5.1	6.6	7.8	7.4
Lactate (mEq/L)	13.9	8.9	13.4	9.8	13.1	8.7	18.3	11.4
Chloride								
(mEq/L)	17.5	18.5	21.1	18.0	18.2	15.3	11.8	8.7
(% T.Osm.)	21.3	27.8	24.9	26.1	21.3	25.1	10.7	12.8
Sodium								
(mEq/L)	22.5	23.5	24.0	20.4	24.5	17.0	11.5	7.0
(% T.Osm.)	27.4	35.3	28.4	29.6	28.7	27.9	10.4	10.3
Potassium								
(mEq/L)	6.0	5.0	8.2	5.7	9.1	5.2	10.6	5.4
(% T.Osm.)	7.3	7.5	9.7	8.3	10.7	8.5	9.6	7.9
Urea								
(mMol/L)	11.9	10.1	11.9	9.3	13.0	9.9	13.5	15.1
(% T.Osm.)	14.5	15.2	14.1	13.5	15.2	16.2	12.3	22.2
Ammonia								
(mEq/L)	5.9	5.1	6.0	4.6	6.5	4.9	6.7	7.6
(% T.Osm.)	7.2	7.7	7.1	6.7	7.6	8.0	6.1	11.2
Σ of Constituents								
(mOsm/L)	77.7	71.1	84.6	67.8	85.2	61.0	72.4	55.2
(% T.Osm.)	94.6	106.9	92.0	98.3	87.0	98.4	65.8	81.2

TABLE AVIII.14 (Contd)

CHEMICAL COMPOSITION OF SWEAT: GLOVE SWEAT COMPARED WITH CUFF SWEAT FROM DIFFERENT SUBJECTS

Subject 2 (N. M.)

Constituent	Conditions, Samples and Arms							
	Bicycle 1		Bicycle 2		Stepping		Sitting	
	Glove (RH)	Cuff (LH)	Glove (LH)	Cuff (RH)	Glove (RH)	Cuff (LH)	Glove (RH)	Cuff (LH)
Total Osmolarity (mOsm/L)	81.5	89.5	35.0	59.0	73.5	66.0	82.5	58.0
Lactic Acid (mEq/L)	11.4	7.9	4.2	9.2	11.9	9.4	15.5	9.2
(% T.Osm.)	14.0	8.8	12.0	15.6	18.0	14.2	18.7	15.9
pH	5.0	5.0	5.0	4.9	4.5	4.7	8.0	4.8
Lactate (mEq/L)	10.7	7.4	3.9	8.4	9.9	8.3	15.5	8.2
Chloride (mEq/L)	16.8	20.7	7.8	14.4	17.7	17.3	10.8	8.8
(% T.Osm.)	20.6	23.1	22.3	24.4	26.8	26.2	13.1	15.2
Sodium (mEq/L)	17.5	----	6.0	13.8	15.6	18.0	8.5	6.0
(% T.Osm.)	21.5	----	17.2	23.4	23.6	27.3	10.3	10.3
Potassium (mEq/L)	8.0	----	2.6	5.2	7.0	6.7	8.2	5.4
(% T.Osm.)	9.8	----	7.4	8.8	10.6	10.2	9.9	9.3
Urea (mMol/L)	11.7	8.6	8.6	9.3	9.3	9.2	11.1	10.6
(% T.Osm.)	14.3	9.6	24.6	15.8	12.7	13.9	13.4	18.3
Ammonia (mEq/L)	5.9	4.3	4.3	4.6	4.6	4.6	5.6	5.3
(% T.Osm.)	7.2	4.8	12.3	7.8	6.3	7.0	6.8	9.1
Σ of Constituents (mOsm/L)	71.3	----	33.5	56.5	66.1	65.2	59.6	45.3
(% T.Osm.)	87.5	----	95.7	95.8	98.0	98.8	72.2	78.1

TABLE AVIII.14 (Contd)

CHEMICAL COMPOSITION OF SWEAT: GLOVE SWEAT COMPARED WITH CUFF SWEAT FROM DIFFERENT SUBJECTS

Subject 3 (G. W.)

Constituents	Bicycle 1 Glove (RH)	Bicycle 1 Cuff (LH)	Bicycle 2 Glove (LH)	Bicycle 2 Cuff (RH)	Stepping Glove (RH)	Stepping Cuff (LH)	Sitting Glove (RH)	Sitting Cuff (LH)
Total Osmolarity (mOsm/L)	204.5	158.0	183.5	228.5	187.5	173.5	----	----
Lactic Acid (mEq/L)	17.9	9.4	10.4	18.9	15.0	12.7	76.2	----
Lactic Acid (% T.Osm.)	8.7	6.0	5.7	6.6	8.0	7.3	----	----
pH	6.2	7.4	7.5	7.0	7.7	7.0	----	----
Lactate (mEq/L)	17.9	9.4	10.4	18.9	15.0	12.7	----	----
Chloride (mEq/L)	65.7	51.6	58.5	94.3	77.7	73.8	51.2	----
Chloride (% T.Osm.)	32.1	32.7	31.8	41.2	41.4	42.5	----	----
Sodium (mEq/L)	69.0	56.0	61.1	88.0	79.5	78.5	39.0	----
Sodium (% T.Osm.)	33.7	35.4	33.2	38.5	42.4	45.2	----	----
Potassium (mEq/L)	8.2	6.0	5.0	9.2	9.3	7.1	9.0	----
Potassium (% T.Osm.)	4.0	3.8	2.7	4.0	5.0	4.1	----	----
Urea (mMol/L)	9.2	8.6	6.9	8.9	9.3	7.1	----	----
Urea (% T.Osm.)	4.5	5.4	3.8	3.9	5.0	4.1	----	----
Ammonia (mEq/L)	4.6	4.3	3.4	4.4	4.6	3.6	----	----
Ammonia (% T.Osm.)	2.2	2.7	1.8	1.9	2.4	2.1	----	----
Σ of Constituents (mOsm/L)	174.6	135.9	145.3	223.7	195.4	182.8	----	----
Σ of Constituents (% T.Osm.)	85.4	86.0	79.2	97.9	104.2	105.4	----	----

TABLE AVIII.15

IONIC BALANCE IN THE SWEAT OF THREE NORMAL SUBJECTS

Constituent	Conditions, Samples, and Arms							
	Bicycle 1		Bicycle 2		Stepping		Sitting	
	Glove (RH)	Cuff (LH)	Glove (LH)	Cuff (RH)	Glove (RH)	Cuff (LH)	Glove (RH)	Cuff (LH)
				Subject 1				
Anions (mEq/L)	31.4	27.4	34.5	27.8	31.3	24.0	30.1	20.1
Cations (mEq/L)	34.4	33.6	38.2	30.7	40.1	27.1	28.8	20.0
Difference (mEq/L)	+3.0	+6.2	+4.7	+2.7	+8.8	+3.1	-1.3	-0.1
				Subject 2				
Anions (mEq/L)	27.5	28.1	11.7	22.8	27.6	25.6	26.3	17.0
Cations (mEq/L)	31.4	----	12.9	23.6	27.2	29.3	22.3	16.7
Difference (mEq/L)	+3.9	----	+1.2	+0.8	-0.4	+3.7	-4.0	-0.3
				Subject 3				
Anions (mEq/L)	83.6	61.0	68.9	113.2	92.7	86.5	----	----
Cations (mEq/L)	81.8	66.3	69.5	101.6	93.4	89.2	----	----
Difference (mEq/L)	-1.8	+5.3	+0.6	-11.6	+0.7	+2.7	----	----

comparison from the data shown in Table AVIII.14 was that of thermal sweat (experiment D) collected with the cuff versus that collected in the glove. The mean value for two subjects using the cuff was 79.65% T.Osm. and the mean value for glove sweat, for two subjects, was 61.00%. These two methods of collecting were not found to be statistically different ($t = 2.99$, $P < 0.10$, $P > 0.05$). The sample size may be an important factor in this statistical analysis. When a comparison was made using work sweat, both glove and cuff, against thermal sweat, also glove and cuff, for all subjects, these

methods of collection were found to be statistically different ($t = 5.21$, $P < 0.001$). The mean values were 94.52% and 74.32%, respectively, for work sweat and thermal sweat. A similar comparison was made of work cuff sweat, the mean value being 98.44%, against thermal cuff sweat having a mean value of 79.65%. A significant difference was observed ($t = 6.81$, $P < 0.001$). The last comparison was of glove sweat; the mean value for work glove sweat was 90.61%, and the mean value for work cuff sweat was 98.44%. Again a significant difference was observed ($t = 5.42$, $P < 0.001$).

From the above five statistical comparisons two conclusions may be drawn. The first is that forearm sweat, including the hand, is different from forearm sweat, collected from the wrist to the elbow. The second is that work sweat is different from thermal sweat. This second conclusion is in our opinion the more important, for it is known that sweat collected from different parts of the body is different in its chemical composition (61, 120, 121, 122, 128), but a difference of the chemical composition of sweat during rest and work states has not been reported in the literature. Another interesting observation was that thermal sweat has a larger osmotic deficit than does work sweat. In the previous discussion of "t" tests on % T.Osm., the grand mean value for thermal sweat was 74.32%; for thermal glove sweat the mean value was 69.99%. For thermal cuff sweat, the mean value was 79.65% as opposed to a grand mean value for work sweat of 94.52%. For work glove sweat the mean value was 90.61%; and for work cuff sweat the mean value was 98.44%. The major physical difference between these two types of sweat is the rate of secretion, thermal sweating taking place at a slower rate than work sweating. This feature of sweat, rate of sweating, will be discussed later.

The two other factors to be tested were found to be statistically insignificant. All mean values of Lichton fell within one standard deviation of the mean value of the control group. This observation caused Lichton to review his original paper and to discover the technical error. The other factor, the possible error arising from studies on frozen samples, was considered negligible because those determinations were in complete accord with the November experiment even after one year of storage at -20°F.

Table AVIII.15 shows results similar to those observed from our original data on ionic balance in sweat. The main point of note is electrolytic imbalance. We are unable to account for this electrolytic imbalance in our specimens in terms of the measured cations or anions. Because we find in a majority of cases a positive imbalance, we suggest that an organic acid, or organic acids, which has received little or no attention in the earlier literature of sweat chemistry, is an important factor both as the anion (or anions) needed to shift the electrolytic imbalance to neutrality and as the prime factor concerned in the deficit observed when we calculate each solute as percent of total osmolarity and sum these individual values. This latter point, the sum of the constituents, will be discussed in the following section.

E. DISCUSSION OF "UNKNOWN OSMOL"

We have established that the sum of the major constituents, i.e., sodium, chloride, lactic acid, urea, potassium, and ammonia, does not account for 90% of the total osmolarities, at all concentrations, as reported by Van Heyningen (120) and Amatruda and Welt (4) and assumed by most investigators working in the field of sweat chemistry. Usually the sum is less than 90%. We observed that as the total osmolarity increases, the sum of the constituents does not increase proportionally; there is an absolute difference between the increased osmolarity of sweat and the sum of the constituents. The best means of scrutinizing the data is to calculate each value as the percentage of the total osmolarity, for to state a basic mathematical law, the sum of the component parts must equal the whole (100%). Therefore, all data has been and will continue to be discussed as percent of the total osmolarity. If there is an absolute difference between the various constituents, in mEq/L or mMol/L and the total osmolarity, in mOsm/L, the percentage calculation, being directly related to the absolute values, will give insight into trends.

Figure AVIII.4 shows the linear regression equation for 150 experimental specimens for two periods of study, PRE II and EXP I, when the ambient temperatures were very similar. The slope of the linear regression equation is -0.1490. It is noted from this relation that in sweat osmolarities of high concentration the percent sum of the major constituents decreases and another solute (or solutes), which contributes very little to the osmotic pressure in sweat osmolarities of lower concentrations, becomes the most important solute of sweat. This solute has not as yet been identified. The first suggestion that may be thought of is the interaction of ionizible particles, thereby giving this effect. This view we do not believe, mainly because of the experiment of "synthetic" sweat (Appendix II, Section D) where the concentration was 570 mOsm/L and only the normal 10% deficit due to non-dissociation was observed, and if there was such an interaction, the total osmolarity of sweat would be reduced by the increased amount of non-dissociation of the moieties. We did not correct for dissociation in order that the maximum effect could be observed. Figure AVIII.4 has a Y-intercept of 111.43 and adjusting for dissociation would only reduce this value to 101.43, thereby shifting the curve to a parallel position 10 units.

Figure AVIII.4 also shows the rate of sweating, in ml/hr, as plotted against the % of the measured osmolarity contributed by the sum of the solutes. From this observation we are able to show that this unknown substance is a direct function of sweat rate. The slope, mathematical relations, and other data from this observation will not be discussed here. Further information may be found in WADC Technical Report 53-484, Part 3 (101). A hypothesis regarding two types of sweat has been proposed and may be found in this same reference. This hypothesis relates sweat chemistry and rate of sweating and will be discussed in this report briefly because of its importance in the discussion of rate of sweating. For a more extensive discussion, interested persons should read the reference given above in this section.

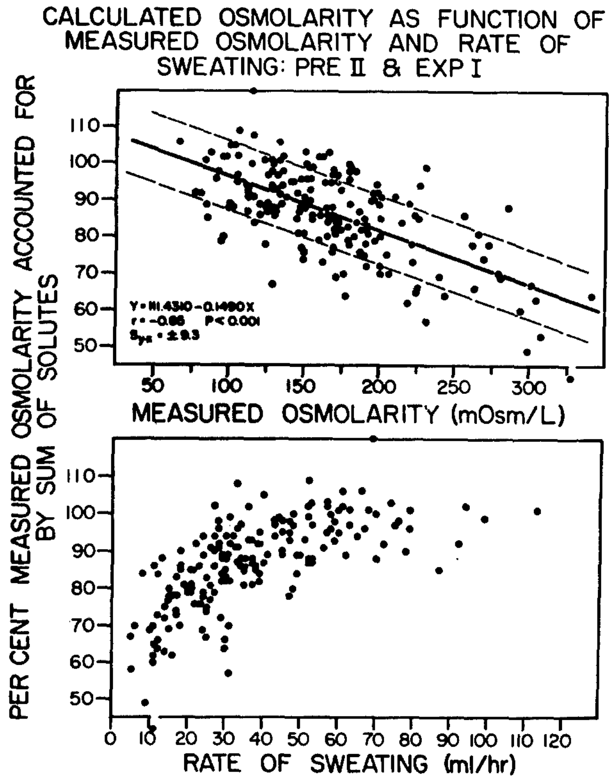

FIGURE AVIII.4. CALCULATED SWEAT OSMOLARITY AS A FUNCTION OF MEASURED OSMOLARITY AND RATE OF SWEATING: PRE II AND EXP I.

We postulate that the chemical composition of each type of sweat is constant but that their rates of production are different. "Sweat A" is assumed to be similar to intracellular fluid, i.e., low sodium and chloride, high potassium, nitrogenous constituents, and total osmolarity. The rate of production of "Sweat A" is quite low, and is considered to contain a high concentration of the unknown osmol "X". "Sweat B" is assumed to be similar to extracellular fluid, i.e., high sodium and chloride, little or no potassium, nitrogenous constituents, and relatively dilute osmolarity - - assumed to contain no osmol "X" . If we accept these assumptions, then for any given rate of sweating the concentration of any solute will depend upon its concentration in both types of sweat and upon the relative contribution made by each to the total sweat volume. These assumptions are based on the actual observed data presented in this report and are shown in Figure AVIII. 5. Each curve found in Figure AVIII.5 is the plot of observed data except those assuming two types of sweat, "Sweat A" and "Sweat B." In the literature one is able to find many statements for and against the assumptions presented, and further work is certainly needed to test the applicability and validity of the assumptions.

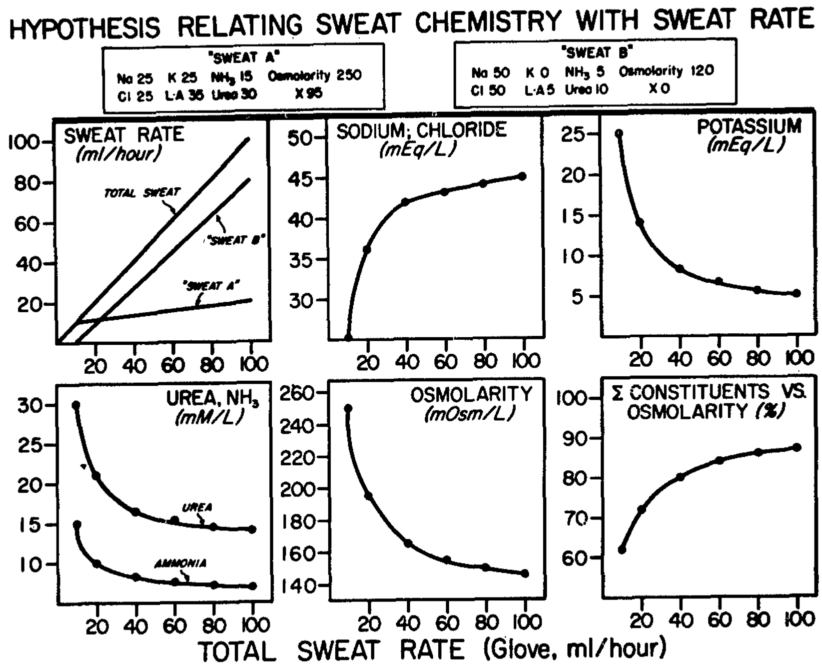

FIGURE AVIII.5. HYPOTHESIS RELATING SWEAT CHEMISTRY TO SWEAT RATE.

Attempts have been made to classify this unknown osmol "Y." The first was to test the possibility of the liberation of CO_2 from sweat. This attempt was based on the report of Tokuro and Suzuki (118). They observed an increase in CO_2 from 0.5 vol % to 8.5 vol % with increased rates of sweating. Three subjects were used to test CO_2 dissociation in sweat. Sweat was collected from the working individual in obstetrical gloves. The results are shown in Table AVIII.16. The dissociation of CO_2 in sweat is similar to the dissociation of CO_2 in water, for an increase of CO_2 tensions to 80 vol % only increased the osmolarity 4 mOsm/L. From these data we concluded that CO_2 is not the "X" osmol because with only a 4 mOsm/L increase in total osmolarity at 80 vol % CO_2 there would be no significant effect of CO_2 in sweat at normal CO_2 tensions of 0.04 vol %.

Other clues for identification were as follows:

1. That our sweat specimens were in electrolytic imbalance; this agrees with the original observations of Dill, Hall and Edwards (20), although we disagreed in the sign of the imbalance.

2. That the qualitative data of our specimens showed peculiar results with certain color reactions.

   a) Blue with nitroprusside - a keto acid

   b) Pink with sulfosalyeylic acid

   c) Negative glucose test always; in agreement with previous investigations: Itch, Fugishiro, Suchi, and Shimokata (33) and Lòbitz and Ostenberg (66)

   d) Negative albumin test always, later verified with metaphosphoric acid at this laboratory.

The results are discussed in further detail by Sargent, Johnson, and Sargent (101).

The above cited observations caused a determination of total ketone bodies in sweat to be developed (48). The results conclusively showed that the unknown osmol cannot be accounted for by total ketone bodies. The mean value was 0.559 mMol/L for the experimental group with individual values ranging from 0.08 to 2.05 mMol/L. For the control group the mean value was 0.349 mMol/L and the range, 0.08 to 1.60 mMol/L.

We feel that the unidentified solute possibly may be an organic acid, or organic acids, with a relatively high pK. Citric acid and/or succinic acid meet the qualifications that are necessary to be the unknown osmol, primarily because of the electrolytic imbalance observations, the pH of our sweat specimens and because they are normal constituents of blood.

A pigmentation was observed upon pooling the sweat samples into clean glass jugs in the following manner:

1. The sum of the constituents was $\geq$ 95%.

2. The sum of the constituents was $\geq$ 85%, $\leq$ 94%.

3. The sum of the constituents was $\leq$ 84%.

A spectral absorption curve was run and in the sample with the maximum deficit there was a maximum absorption at 400 mμ. The source and identification of this pigment has not been reported in the literature and for this reason is of possible important interest.

From these attempts we summarize our investigations as follows:

1. If we calculate the % of total osmolarity contribution by the major osmotically active constituents in eccrine sweat there is found a deficit with increasing osmolarity.

TABLE AVIII.16

CARBON DIOXIDE DISSOCIATION CURVE FOR SWEAT

Equilibrating Gas CO_2	Equilibrating Gas N_2	Subject	Sweat[1] CO_2 (mMol/L)	Supernatant[2] Gas $mnCO_2$	Supernatant[2] Gas mnO_2	pH[3]	Osmolarity[4] (mOsm/L)
0%	100%	GNW	0.10	0.44	0.89	6.21	204.5
		DBD	0.02	0.44	3.41	4.48	120.5
		NM	0.13	7.13	6.83	4.35	106.5
30%	70%	GNW	4.29	204.84	1.93	5.78	207.0
		DBD	3.68	190.59	5.72	4.30	121.5
		NM	4.12	209.07	4.16	4.35	109.0
50%	50%	GNW	6.69	347.34	2.89	5.44	209.0
		DBD	6.58	347.79	4.16	4.55	123.5
		NM	6.50	----	7.35	4.38	110.0
80%	20%	GNW	10.62	----	----	5.52	209.0
		DBD	9.89	591.08	2.23	4.62	124.0
		NM	9.92	549.37	5.42	4.37	110.5
Raw Sample		GNW	0.26	----	----	6.00	206.0
		DBD	0.26	----	----	5.70	119.0
		NM	0.12	----	----	----	107.0

Note: Each value is the average of two determinations.

---

1 By Van Slyke manometric method

2 By Scholander micro gas analyzer (0.5 ml)

3 By anaerobic gas electrode

4 By Fiske Osmometer, calibration curve for NaCl standards; Theoretical values: 100 - 180 - 300 - 400 - 500 - 750; Observed values: 99 - 179.5 - 296 - 409 - 497.5 - 765.5

2. This deficit is believed to be greater at low rate of sweating.

3. If we subtract the sum of the measured anions, chloride and lactate, from the sum of the measured cations, sodium, potassium, and ammonia, we find that an electrolytic imbalance is positive.

4. The unknown osmol is not CO_2 or phosphate.

5. The unknown osmol is not total ketone bodies.

6. The unknown osmol may be an organic acid with a high pH, like citric or succinic acid.

7. We observed a pigment in eccrine sweat having a maximum absorption of 400 mμ.

8. More experiments concerning the physical properties must be performed. To list a few:

   a) Boiling point

   b) Polarimetry

   c) Viscosity

   d) Ashing

   e) Colorimetry

   These may help determine the unknown substance in eccrine sweat.

F. SUMMARY

A systematic study of sweat osmolarity as related to chemical composition has been made. Four hundred and twenty-eight eccrine sweat samples were collected in obstetrical gloves from 100 human male subjects marching at a pace of 3.75 m.p.h. around an oval quarter-mile track in moist summer heat. The effective temperature ranged from 65.1° to 82.4°F during five marches.

Total sweat osmolarity was calculated from freezing point measured with a thermistor device (Fiske Osmometer). Sodium, chloride, potassium, lactic acid, urea, ammonia, creatinine, and total ketone bodies were determined quantitatively by standard chemical procedures. The results were as follows:

	Experimental Group		Control Group	
	Mean	Range	Mean	Range
Total Osmolarity, mOsm/L	163	51-374	108	69-194
Sodium, mEq/L	41	11-99	27	11-63
Chloride, mEq/L	38	10-100	26	11-63
Potassium, mEq/L	12	4-32	8	4-19
Urea, mMol/L	19	7-33	15	8-23
Ammonia, mEq/L	10	3-17	7	4-11
Lactic Acid, mEq/L	20	2-34	17	2-34
Creatinine, mMol/L	0.07	0.01-0.38	0.07	0.00-0.16
Total Ketone Bodies, mMol/L	0.57	0.08-2.05	0.35	0.08-1.60

Qualitative analyses were made to test for pH, glucose, albumin, and ketone bodies. An Addis count was made of formed elements. Neither of these was discussed in detail.

The sum of the major constituents of eccrine sweat, i.e., sodium, chloride, potassium, urea, ammonia, and lactic acid, when calculated as percent of the total osmolarity does not equal 90% or greater in all osmolarities studies. There is a deficit. As the osmolarity of sweat becomes more concentrated, this deficit may be as large as 50% of the total osmolarity. The linear relation of the individual sums of the major constituents, in percent, to their total osmolarities was found to have a negative slope of -0.1490 for the experimental group and a negative slope of -0.1034 for the control group.

An unmeasured solute, not CO_2, inorganic phosphates, or total ketone bodies (because of their low concentrations in eccrine sweat) is believed to be the cause of this deficit. When we summed the major anions and cations and subtracted the sum of the major anions from the sum of the major cations, we observed an electrolytic imbalance towards positivity. Considering the average pH of our sweat specimens of 5.0, we postulate that this unmeasured solute present in sweat samples of higher concentrations is possibly an organic acid or organic acids, such as citric acid or succinic acid.

We observed a pigment in eccrine sweat with maximal absorption at 400 $m\mu$. In samples of the highest osmotic deficit, this pigment was most concentrated. Its identity is unknown.

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H. TABLES OF ORIGINAL DATA

In the following tables we have detailed the analyses - both qualitative and quantitative - made on specimens of meat collected from subjects participating in the 1955 summer test. The tables of data have been arranged in the same fashion as those given in Appendix II. The notations have the same meaning as described in that appendix.

TABLE AVIII.17

VOLUME OF GLOVE SWEAT: FLIGHT 1
(ml/hr)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	41	43	40	-	16	26
2	28	47	-	-	-	41
3	118	33	27	-	24	18
4	52	48	32	-	30	16
5	21	63	52	-	-	42
6	22	53	57	-	25	20
7	18	14	26	-	25	41
8	52	87	61	-	45	70
9	50	70	63	-	30	50
10	23	43	37	-	17	31
11	42.7	38	31	-	47	38
12	17.3	33	37	-	32	41
13	4	12	12	-	-	-
14	5	11	22	-	10	5
15	24	34	33	-	-	-
16	12	12	21	-	-	-
17	8	-	21	-	10	20
18	7	27	11	-	8	21
19	38	58	49	-	48	-
20	11	28	27	-	-	-
21	10	25	23	-	14	19
22	16	14	24	-	20	38
90	12	45	36	-	38	28
91	29	43	59	-	39	49
92	3	34	39	-	12	14

TABLE AVIII.18

VOLUME OF GLOVE SWEAT: FLIGHT 2
(ml/hr)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	32	62	21	-	25	31
24	10	18	18	-	-	-
25	17	39	19	-	23	25
26	26	24	26	-	21	24
27	26	-	8	-	21	24
28	15	29	15	-	14	16
29	41	44	30	-	41	48
30	-	26	17	-	(22)	21

* No data for Experimental II

TABLE AVIII.18 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
31	35	67	51	-	53	47
32	16	20	30	-	30	24
33	33.6	47	30	-	46	50
34	32.5	31	30	-	39	30
35	20	22	29	-	30	18
36	38	78	57	-	41	59
37	10	16	6	-	18	5
38	33	39	45	-	62	47
39	33	48	47	-	-	-
40	6	-	-	-	36	29
41	8	11	-	-	-	23
42	6	4	5	-	11	7
43	10	10	11	-	16	18
44	5	13	28	-	17	15
93	9	-	-	-	-	-
94	28	68	74	-	53	51
95	22	28	29	-	27	18
102	-	-	-	-	-	39

TABLE AVIII.19

VOLUME OF GLOVE SWEAT: FLIGHT 3

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	(9)	33	11	-	15	21
46	24	57	29	-	33	28
47	59	99	40	-	76	70
48	11	30	20	-	17	20
49	10	33	31	-	37	50
50	33	56	35	-	55	53
51	11	24	24	-	31	30
52	20	60	41	-	57	60
53	14	52	17	-	23	33
54	28	36	35	-	40	57
55	23	52	39	-	50	40
56	54	94	69	-	98	95
57	25	52	36	-	72	53
58	18	-	-	-	44	25
59	-	-	2	-	5	9
60	46	66	61	-	55	62
61	5	17	5	-	17	6
62	25	48	35	-	43	41
63	8	16	15	-	16	26
64	19	28	15	-	36	20
65	35	70	53	-	56	52

TABLE AVIII.19 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
66	20	35	30	-	30	41
96	31	60	47	-	45	54
97	78	113	79	-	74	87
98	26	76	37	-	77	58

TABLE AVIII.20

VOLUME OF GLOVE SWEAT: FLIGHT 4

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	17	39	25	-	31	33
68	6	3	1	-	4	-
69	23	24	15	-	31	25
70	12	53	21	-	37	30
71	28	58	30	-	52	46
72	32	30	23	-	26	27
73	42	52	25	-	-	-
74	24	34	45	-	39	61
75	41	45	30	-	59	47
76	25	65	25	-	36	37
77	14	27	-	-	-	-
78	32	57	31	-	61	45
79	8	6	5	-	12	24
80	26	12	18	-	21	16
81	16	18	17	-	24	17
82	-	20	14	-	-	34
83	19	10	11	-	14	19
84	13	29	9	-	35	32
85	34	59	49	-	68	68
86	32	53	31	-	33	33
87	30	49	-	-	-	51
88	23	38	-	-	-	-
99	19.3	27	23	-	26	12
100	53.9	72	92	-	82	66
101	41.7	75	79	-	57	51

TABLE AVIII.21

QUALITATIVE ALBUMIN: FLIGHT 1

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	0	0	0	-	0	0(pink)
2	0	0	-	-	-	0(pink)
3	0	0	0	-	0	0
4	0	0	0	-	0	0
5	0	0	0	-	-	0
6	0	0	0	-	0	0
7	0	0	0	-	0	0
8	0	0	0	-	0	0
9	0	0	0	-	0	0
10	0	0	0	-	0	0
11	0	-	0	-	0	0(pink)
12	0	-	0	-	0	0(pink)
13	-	0(pink)	0(pink)	-	-	-
14	-	0(pink)	0	-	0	-
15	0	0	0	-	-	-
16	0	0(pink)	0	-	-	-
17	0	-	0	-	0	0
18	0	0	0(pink)	-	-	0(pink)
19	0	0	0	-	0	-
20	0	0	0	-	-	-
21	0	0	0	-	0	0(pink)
22	0	0	0	-	0	0
90	0	0	0	-	0	0
91	0	0	0	-	0	0
92	-	0	0	-	0	0

TABLE AVIII.22

QUALITATIVE ALBUMIN: FLIGHT 2

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	0	0	0(pink)	-	0	0(pink)
24	0	0	0	-	-	-
25	0	0	0	-	0	0(pink)
26	0	0	0	-	0	0(pink)
27	0	-	0	-	0	0
28	0	0	0(pink)	-	0(pink)	0(pink)
29	0	0	0	-	0	0
30	-	0	0	-	0	0
31	0	0	0	-	0	0

TABLE AVII.22 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
32	0	0	0	-	0	0
33	0	-	0(pink)	-	0	0(pink)
34	0	-	0	-	0	0(pink)
35	-	-	0	-	0	0(pink)
36	-	-	0	-	0	0
37	0	0	-	-	0	-
38	0	0	0	-	0	0
39	0	0	0	-	-	-
40	-	-	-	-	0	0
41	0	0	-	-	-	0
42	-	-	-	-	0(pink)	-
43	0	0	0(pink)	-	0(pink)	0(pink)
44	-	0	0	-	0(pink)	0(pink)
93	0	-	-	-	-	-
94	0	0	0	-	0	0
95	0	0	0	-	0	0
102	-	-	-	-	-	0

TABLE AVIII.23

QUALITATIVE ALBUMIN: FLIGHT 3

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	-	0	0	-	0	0(pink)
46	0	0	0	-	0	0
47	0	0	0	-	0	0
48	0	0	0(pink)	-	0	0
49	0	0	0	-	0	0
50	0	0	0	-	0	0
51	0	0(pink)	0(pink)	-	0	0
52	0	0	0	-	0	0
53	0	0	0	-	0	0
54	0	0	0	-	0	0
55	0	0	0	-	0	0
56	0	0	0	-	0	0
57	0	0	0	-	0	0
58	0	-	-	-	0	0
59	-	-	-	-	-	-
60	0	0	0	-	0	0
61	-	0(pink)	-	-	0	-
62	0	0	0	-	0	0
63	0	0(pink)	0(pink)	-	0(pink)	0
64	0	0	0	-	0	0
65	0	0	0	-	0	0
66	0	0	0(pink)	-	0	0

TABLE AVIII.23 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
96	0	0	0	-	0	0
97	0	0	0	-	0	0
98	0	0	0	-	0	0

TABLE AVIII.24

QUALITATIVE ALBUMIN: FLIGHT 4

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	0	0	0	-	0(pink)	0
68	-	-	-	-	-	-
69	0	0	0	-	0	0
70	0	0	0	-	0	0
71	0	0	0	-	0	0
72	0	0	0	-	0	0
73	0	0	0	-	-	-
74	0	0	0	-	0	0
75	0	0	0	-	0	0
76	0	0	0	-	0	0
77	0	0	-	-	-	-
78	0	0	0	-	0	0
79	-	0(pink)	-	-	0(pink)	0
80	0	0(pink)	0	-	0	0(pink)
81	0	0	0	-	0	0
82	-	0(pink)	0(pink)	-	-	0
83	0	0(pink)	0(pink)	-	0	0(pink)
84	0	0	0(pink)	-	0	0
85	0	0	0	-	0	0
86	0	0	0	-	0	0
87	0	0	-	-	-	0(pink)
88	0	0	-	-	-	-
99	0	0	0(pink)	-	0	0
100	0	0	0	-	0	0
101	0	0	0	-	0	0

TABLE AVIII.25

ROTHERA REACTION ON SWEAT: FLIGHT 1*

Experimental Regimen	PRE I	PRE II	EXP I	REC I	REC II
ST 0	1B,2B,1B,4B	2G,2G,3G,2G	3BG,-,+3BG,2BG	3BG,-, 4B,4BG	3G,1BG,3BG,2BG
0/100/0 1000	4B,3B	2G,3G	+2BG,2BG	-,3BG	1BG,1BG

TABLE AVIII.25 (Contd)

Experimental Regimen	PRE I	PRE II	EXP I	REC I	REC II
0/100/0 2000	4B,4B	2G,2G	3BG,Y	3BG,3BG	2BG,2BG
2/20/78 1000	1B,3B	3G,4G	1BG,2BG	-,4BG	-,-
2/20/78 2000	3B,2B	3G,4G	3BG,3BG	-,-	-,-
15/52/33 1000	1B,1B	-,2G	3BG,3BG	4B,3BG	2G,2BG
15/52/33 2000	4B,1B	2G,2G	3BG,3BG	3BG,-	-,-
15/52/33 3000	2B,1B	2G,3G	3B,3B	2BG,3BG	2BG,2G
30/0/70 1000	2B,1B	1G,1G	Y,Y	3BG,3BG	2G,3BG
30/0/70 2000	1B,2B	2G,2G	3BG,3BG	1BG,3B	3G,2BG
FRA	2B,2B,1B	1G,2G,2G	3B,2BG,3B	2BG,3BG,4B	2G,2BG,3B

* B = blue, G = green, Y = yellow, BG = blue green, P = purple, BP = blue purple, YG = yellow green

TABLE AVIII.26

ROTHERA REACTION ON SWEAT: FLIGHT 2*

Experimental Regimen	PRE I	PRE II	EXP I	REC I	REC II
STO	3B,4B,4B,3B	1G,2G,3G,2G	3BP,3P,3BP,3BG	3BG,-,3BG,3BG	2B,-,3BG,2BG
0/100/0 1000	2B,3B	-,4G	2B,2BG	3G,4B	3Y,3B
0/100/0 2000	4B,-	2G,3G	3B,3B	3BG,3BG	3G,3BG
2/20/78 1000	4B,4B	2G,1G	3B,3B	3BG,3B	4G,3BG
2/20/78 2000	3B,2B	2G,2G	YG,3B	3BG,1G	-,2G
15/52/33 1000	2B,4B	2G,-	3B,-	-,2BG	-,3G
15/52/33 2000	3B,3B	4G,4	-,YG	-,3BG	3BG,-
15/52/33 3000	1B,2B	3G,1G	3B,3B	3BG,3BG	3B,2BG
30/0/70 1000	1B,4B	2G,3G	2B,2B	3BG,3BG	2BG,3B
30/0/70 2000	4B,2B	2G,3G	3B,3B	3BG,3BG	3G,3BG
FRA	1B,0,1B,-	-,1G,1G,-	-,2BG,3B,-	-,1BG,2G,-	-,1G,3G,2BG

* See footnote for Table AVIII.25

TABLE AVIII.27

ROTHERA REACTION ON SWEAT: FLIGHT 3*

Experimental Regimen	PRE I	PRE II	EXP I	REC I	REC II
STO	4B,1B,2B,4B	3G,2G,3G,3G	3BP,2BG,3P,2P	2BG,2G,1G,2BG	3B,2BG,2G,2BG
0/100/0 1000	3B,3B	3G,3G	3B,3B	2BG,3BG	2G,2BG
0/100/0 2000	4B,1B	4G,3G	3B,2BG	2BG,1BG	3BG,1G
2/20/78 1000	2B,2B	2G,-	3B,-	1BG,1BG	2G,3BG
2/20/78 2000	-,1B	-,1G	-,1B	-,1BG	2BG,3G
15/52/33 1000	4B,3B	4G,3G	3BG,1BG	3B,1BG	3BG,2BG
15/52/33 2000	3B,3B	4G,4G	3B,2B	4B,1BG	3BG,3BG
15/52/33 3000	4B,4B	1G,3G	1BG,3B	2BG,4B	3G,3G
30/0/70 1000	2B,2B	2G,3G	2P,2P	2BG,2BG	1G,3G
30/0/70 2000	3B,4B	2G,2G	3B,2B	2BG,2BG	2BG,2BG
FRA	4B,1B,2B	4G,1G,2G	1B,2BG,3B	1BG,2BG,2BG	3BG,2G,2G

* See footnote for Table AVIII.25

TABLE AVIII.28

ROTHERA REACTION ON SWEAT: FLIGHT 4*

Experimental Regimen	PRE I	PRE II	EXP I	REC I	REC II
STO	1B,2B,1B,4B	3G,4G,4G,3G	3P,-,1P,3BP	2BG,-,1BG,2B	2BG,-,2G,2BG
0/100/0 1000	3B,3B	2G,2G	3B,2B	1BG,3BG	1G,3BG
0/100/0 2000	1B,4B	2G,3G	2B,2B	-,2BG	-,2BG
2/20/78 1000	4B,2B	4G,4G	-,Y	4B,4BG	2BG,3BG
2/20/78 2000	3B,-	3G,4B	2B,2B	3B,-	3BG,2G
15/52/33 1000	2B,2B	4G,1G	0,0	4B,3B	3BG,2BG
15/52/33 2000	2B,2B	3G,2G	0,2B	2B,4B	2G,3G
15/52/33 3000	1B,3B	2G,2G	-,-	-,-	2G,-

TABLE AVIII.28 (Contd)

Experimental Regimen	PRE I	PRE II	EXP I	REC I	REC II
30/0/70 1000	2B,2B	3G,3G	3B,2BG	1BG,4B	1G,2G
30/0/70 2000	4B,2B	3G,4B	-,3B	-,4BG	-,3G
FRA	3B,2B,1B	2G,2G,1G	3B,3B,1B	2BG,2BG,3BG	2G,3G,2G

* See footnote for Table AVIII.25

TABLE AVIII.29

QUALITATIVE pH: FLIGHT 1

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	5.0	5.0	4.5	-	4.5	4.5
2	5.0	5.0	-	-	-	5.0
3	5.0	5.0	5.0	-	5.0	5.5
4	5.0	5.0	4.5	-	4.5	5.0
5	5.0	5.0	4.5	-	-	5.0
6	5.5	5.0	4.5	-	4.5	5.5
7	5.0	5.0	4.5	-	4.5	4.5
8	5.5	5.0	4.5	-	4.5	4.5
9	5.0	5.0	5.0	-	4.5	5.0
10	5.0	5.5	5.0	-	4.5	4.5
11	5.0	5.0	5.0	-	4.5	4.5
12	5.0	4.5	5.0	-	4.5	4.5
13	4.5	5.0	5.0	-	-	-
14	5.0	5.0	5.0	-	5.0	5.5
15	5.0	5.0	4.5	-	-	-
16	5.0	5.0	4.5	-	-	-
17	5.0	-	5.0	-	5.5	4.5
18	5.0	5.0	5.0	-	4.5	5.0
19	5.5	5.0	4.5	-	5.0	-
20	5.0	5.0	4.5	-	-	-
21	5.0	5.0	5.0	-	5.0	5.5
22	5.0	5.0	5.0	-	4.5	5.0
90	5.0	5.0	4.5	-	4.5	4.5
91	5.5	5.0	5.0	-	4.5	4.5
92	5.0	5.0	5.0	-	4.5	5.0

TABLE AVIII.30

QUALITATIVE pH: FLIGHT 2

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	5.0	5.0	4.5	-	5.0	4.5
24	5.0	5.0	5.0	-	-	-
25	5.0	5.0	5.0	-	5.0	4.5
26	5.0	5.0	4.5	-	5.0	5.0
27	5.0	-	4.5	-	4.5	5.0
28	5.0	5.0	4.5	-	4.5	5.0
29	5.0	5.0	4.5	-	5.0	4.5
30	-	5.0	4.5	-	4.5	4.5
31	5.0	5.0	4.5	-	4.5	5.0
32	5.5	4.5	4.5	-	4.5	4.5
33	4.5	5.0	4.5	-	4.5	4.5
34	5.0	5.0	4.5	-	4.5	5.0
35	5.0	5.0	5.0	-	5.0	4.5
36	5.0	5.0	5.0	-	5.0	4.5
37	5.0	5.0	5.0	-	5.0	5.0
38	5.0	5.0	4.5	-	5.0	4.5
39	5.0	5.0	4.5	-	-	-
40	5.0	-	-	-	4.5	5.5
41	5.0	5.0	-	-	-	4.5
42	5.0	5.0	4.5	-	4.5	5.0
43	5.0	5.0	4.5	-	4.5	4.5
44	5.0	5.5	5.0	-	5.0	5.0
93	5.5	-	-	-	-	-
94	5.0	5.0	5.0	-	5.0	5.0
95	5.0	5.0	5.0	-	5.0	5.5
102	-	-	-	-	-	4.5

TABLE AVIII.31

QUALITATIVE pH: FLIGHT 3

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	5.0	5.0	5.0	-	5.0	5.0
46	5.0	5.0	4.5	-	4.5	5.0
47	5.0	5.0	4.5	-	4.5	4.5
48	5.0	5.0	5.0	-	4.5	4.5
49	5.0	5.0	4.5	-	4.5	5.0
50	5.0	5.0	5.0	-	4.5	5.0
51	5.0	5.0	4.5	-	4.5	5.0
52	5.0	5.0	4.5	-	4.5	5.0
53	5.0	5.0	5.0	-	4.5	5.0
54	4.5	5.0	4.5	-	4.5	4.5

TABLE AVIII.31 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II *	REC I	REC II
55	5.0	5.0	5.0	-	4.5	4.5
56	5.5	4.5	5.0	-	5.0	4.5
57	5.0	5.0	5.0	-	4.5	5.0
58	5.5	-	-	-	4.5	5.0
59	-	-	-	-	4.5	4.5
60	5.0	5.0	5.0	-	4.5	5.0
61	5.0	5.0	-	-	4.5	5.0
62	5.0	5.0	5.0	-	5.0	5.5
63	4.5	5.0	4.5	-	5.0	4.5
64	5.0	5.0	5.0	-	4.5	4.5
65	5.0	5.0	5.0	-	4.5	5.0
66	5.0	5.0	4.5	-	4.5	4.5
96	5.0	5.0	5.0	-	4.5	4.5
97	5.0	5.0	5.0	-	4.5	4.5
98	5.0	5.0	5.0	-	5.0	5.0

TABLE AVIII.32

QUALITATIVE pH: FLIGHT 4

Subject Code No.	P I	P II	EXP I	EXP II *	REC I	REC II
67	5.0	5.0	4.5	-	4.5	4.5
68	5.0	4.5	-	-	-	-
69	5.0	5.0	4.5	-	4.5	5.0
70	5.0	5.0	4.5	-	4.5	4.5
71	5.0	5.0	4.5	-	4.5	5.0
72	5.0	5.0	4.5	-	4.5	4.5
73	5.0	5.0	4.5	-	-	-
74	5.0	5.0	4.5	-	4.5	4.5
75	5.0	5.0	4.5	-	4.5	4.5
76	5.0	5.0	4.5	-	4.5	5.0
77	4.5	5.0	-	-	-	-
78	5.0	4.5	4.5	-	5.0	5.0
79	5.0	5.0	-	-	4.5	5.5
80	5.0	5.0	5.0	-	5.5	5.0
81	5.0	5.0	4.5	-	4.5	4.5
82	-	5.0	4.5	-	-	4.5
83	5.0	5.0	4.5	-	4.5	4.5
84	5.0	5.0	4.5	-	4.5	5.0
85	5.0	5.0	4.5	-	4.5	4.5
86	5.0	5.0	4.5	-	4.5	4.5
87	5.5	5.0	-	-	-	5.0
88	5.0	5.0	-	-	-	-
99	5.5	5.0	5.0	-	4.5	5.0
100	5.0	5.0	5.0	-	5.0	5.0
101	5.0	5.0	5.0	-	4.5	5.0

TABLE AVIII.33

QUALITATIVE GLUCOSE AND UROBILINOGEN

Period	Glucose	Urobilinogen
PRE I	All Specimens Negative	All Specimens Negative
PRE II	"	"
EXP I	"	"
REC I	"	"
REC II	"	"

TABLE AVIII.34

SWEAT SODIUM: FLIGHT 1
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	17	39	22	-	18	26
2	48	59	-	-	-	22
3	33	49	30	-	37	39
4	28	62	31	-	42	44
5	48	62	38	-	-	32
6	42	58	26	-	35	30
7	18	44	21	-	19	18
8	19	22	13	-	24	17
9	46	57	22	-	40	29
10	39	67	30	-	36	36
11	34	52	30	-	43	39
12	43	50	15	-	23	32
13	25	34	62	-	-	-
14	52	81	58	-	54	64
15	15	19	23	-	-	-
16	33	53	66	-	-	-
17	55	-	55	-	71	67
18	50	63	23	-	41	40
19	20	36	17	-	24	-
20	27	46	18	-	-	-
21	39	55	29	-	48	52
22	32	49	23	-	27	33
90	16	19	17	-	11	11
91	34	40	37	-	26	19
92	-	26	33	-	20	24

TABLE AVIII.35

SWEAT SODIUM: FLIGHT 2
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	48	62	38	-	35	48
24	33	45	37	-	-	-
25	43	67	41	-	41	58
26	24	33	17	-	22	29
27	18	-	19	-	17	23
28	38	45	41	-	45	47
29	77	92	41	-	98	92
30	-	51	39	-	42	37
31	35	52	31	-	26	28
32	33	44	20	-	20	26
33	31	28	33	-	26	30
34	48	59	33	-	48	55
35	43	49	46	-	57	49
36	67	76	59	-	87	88
37	22	35	50	-	34	31
38	40	49	61	-	63	32
39	15	20	17	-	-	-
40	-	-	-	-	26	27
41	34	52	-	-	-	24
42	25	49	39	-	36	44
43	21	49	35	-	26	27
44	43	80	39	-	64	44
93	33	-	-	-	-	-
94	18	19	23	-	19	13
95	24	27	17	-	23	19
102	-	-	-	-	-	17

TABLE AVIII.36

SWEAT SODIUM: FLIGHT 3
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	69	55	34	-	61	58
46	51	40	44	-	71	68
47	39	49	19	-	63	48
48	37	47	28	-	41	29
49	36	46	28	-	45	29
50	29	36	29	-	42	25
51	45	65	39	-	45	22
52	31	46	24	-	33	30
53	33	51	32	-	33	19
54	40	55	23	-	49	24
55	58	47	44	-	56	22

TABLE AVIII.36 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
56	47	69	53	-	49	45
57	54	55	46	-	54	27
58	46	-	-	-	52	31
59	-	-	42	-	69	28
60	39	53	61	-	55	36
61	28	39	42	-	32	22
62	35	61	48	-	42	41
63	54	76	58	-	99	43
64	57	75	38	-	72	50
65	37	64	27	-	55	28
66	37	42	36	-	40	19
96	44	27	23	-	36	20
97	36	45	52	-	63	45
98	59	48	34	-	32	20

TABLE AVIII.37

SWEAT SODIUM: FLIGHT 4
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	29	36	16	-	32	32
68	24	35	-	-	30	-
69	34	57	28	-	56	44
70	51	57	27	-	59	48
71	38	54	41	-	61	36
72	25	31	23	-	29	20
73	31	36	23	-	-	-
74	58	35	26	-	44	30
75	25	36	20	-	46	23
76	24	38	21	-	40	24
77	82	74	-	-	-	-
78	35	55	28	-	67	50
79	35	90	66	-	60	32
80	32	51	48	-	43	31
81	31	53	67	-	71	44
82	-	36	65	-	-	18
83	23	36	39	-	37	21
84	24	20	32	-	17	14
85	58	61	43	-	62	47
86	38	33	39	-	39	33
87	25	30	-	-	-	20
88	34	35	-	-	-	-
99	22	19	27	-	26	26
100	21	17	15	-	24	24
101	34	23	23	-	32	28

TABLE AVIII.38

SWEAT POTASSIUM: FLIGHT 1
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	4.4	9.8	11.6	-	9.4	9.0
2	10.9	8.3	-	-	-	9.8
3	9.6	7.6	8.9	-	8.2	8.6
4	5.3	11.0	9.6	-	8.9	7.0
5	9.0	5.8	7.5	-	-	8.2
6	9.1	6.5	8.3	-	8.2	8.5
7	10.6	13.7	12.1	-	7.9	7.6
8	10.8	6.8	9.5	-	8.7	8.9
9	7.8	7.2	8.7	-	9.0	9.7
10	8.2	6.8	10.8	-	11.6	12.7
11	10.3	12.6	16.3	-	8.9	12.8
12	11.1	8.9	10.5	-	8.0	11.2
13	13.5	13.8	18.3	-	-	-
14	20.0	16.7	10.9	-	10.7	20.8
15	11.2	12.0	11.5	-	-	-
16	19.8	21.8	17.4	-	-	-
17	11.6	-	13.1	-	11.0	9.8
18	13.8	10.5	13.3	-	11.8	10.9
19	9.6	7.7	10.8	-	7.5	-
20	11.9	10.0	10.7	-	-	-
21	11.0	9.5	14.0	-	13.2	11.6
22	11.5	11.8	12.4	-	10.9	8.9
90	8.7	7.9	8.6	-	8.1	9.8
91	8.9	9.2	8.4	-	10.2	10.0
92	-	8.4	7.3	-	10.6	11.1

TABLE AVIII.39

SWEAT POTASSIUM: FLIGHT 2
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	10.9	8.9	13.0	-	10.3	10.2
24	12.8	13.9	16.2	-	-	-
25	11.7	9.8	14.8	-	10.1	10.3
26	18.0	16.9	15.8	-	16.8	13.6
27	11.3	-	11.8	-	9.9	10.3
28	15.0	15.5	20.2	-	22.0	15.3
29	8.2	7.2	11.0	-	10.4	9.3
30	-	10.5	13.8	-	11.2	11.2

TABLE AVIII.39 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
31	7.3	5.8	8.1	-	6.9	7.2
32	15.0	15.0	9.4	-	9.3	12.0
33	8.1	8.8	20.2	-	11.5	11.5
34	7.8	9.6	14.1	-	8.6	12.1
35	16.2	13.4	12.6	-	12.2	18.0
36	9.0	6.9	7.1	-	9.0	10.5
37	1.7	24.4	25.0	-	13.6	22.8
38	10.1	9.2	9.2	-	7.9	8.1
39	10.6	8.4	12.6	-	-	-
40	-	-	-	-	8.7	8.8
41	16.8	22.0	-	-	-	10.7
42	12.7	19.4	25.8	-	14.3	15.0
43	14.1	2.6	17.5	-	12.0	12.7
44	14.4	18.9	13.4	-	12.6	12.6
93	10.7	-	-	-	-	-
94	11.1	8.0	6.5	-	7.2	9.7
95	8.1	10.2	8.5	-	8.6	11.2
102	-	-	-	-	-	9.3

TABLE AVIII.40

SWEAT POTASSIUM: FLIGHT 3
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	9.9	12.1	22.9	-	10.4	12.4
46	10.5	9.0	12.4	-	7.9	9.2
47	4.0	6.5	10.0	-	7.7	4.8
48	17.8	11.5	14.9	-	14.0	8.9
49	12.2	10.4	14.3	-	8.6	6.3
50	10.8	10.6	12.8	-	7.5	7.1
51	20.0	15.7	17.5	-	9.2	8.6
52	12.1	9.4	10.7	-	7.6	6.8
53	10.5	7.2	14.3	-	7.7	6.9
54	9.8	9.1	10.9	-	7.5	7.7
55	10.7	7.3	11.8	-	7.0	7.1
56	7.7	7.1	8.6	-	6.0	5.6
57	13.8	9.9	9.0	-	6.9	8.0
58	9.0	-	-	-	5.9	6.2
59	-	-	17.8	-	2.7	18.0
60	7.2	7.4	7.3	-	6.6	9.1
61	18.2	17.0	32.0	-	9.6	17.4
62	10.3	11.4	11.5	-	8.4	14.4
63	26.4	18.7	19.2	-	18.0	18.4
64	12.6	12.6	19.4	-	8.3	14.4
65	11.1	6.9	9.9	-	7.1	11.6

TABLE AVIII.40 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
66	9.9	11.2	18.4	-	10.4	12.2
96	9.4	9.3	7.3	-	7.5	7.7
97	4.6	7.5	5.9	-	7.4	7.2
98	9.7	5.8	5.1	-	6.4	5.9

TABLE AVIII.41

SWEAT POTASSIUM: FLIGHT 4
(mEq/L)

Subject Code No.	P.I	P II	EXP I	EXP II*	REC I	REC II
67	14.5	14.8	15.6	-	9.8	12.5
68	10.5	13.5	-	-	11.2	-
69	9.6	14.4	15.2	-	9.0	10.6
70	15.2	9.9	14.9	-	9.4	11.5
71	8.0	7.8	12.5	-	7.6	9.5
72	8.0	15.1	14.9	-	9.4	10.3
73	7.6	8.6	11.8	-	-	-
74	13.4	11.5	7.3	-	8.8	9.4
75	8.7	11.8	15.3	-	9.6	8.4
76	10.6	12.0	19.6	-	9.9	10.7
77	18.8	16.9	-	-	-	-
78	9.1	9.4	17.6	-	8.6	10.9
79	18.8	29.2	19.7	-	14.4	11.2
80	12.8	20.0	15.2	-	11.1	15.2
81	12.1	18.6	11.1	-	11.9	14.3
82	-	17.4	19.8	-	-	8.3
83	14.0	28.0	17.2	-	16.8	8.9
84	12.4	11.8	14.9	-	9.5	14.6
85	7.4	7.5	8.4	-	6.2	8.0
86	15.0	9.9	15.4	-	10.2	10.4
87	11.7	12.0	-	-	-	12.9
88	12.2	12.4	-	-	-	-
99	10.3	11.9	19.0	-	9.3	18.5
100	8.4	6.6	6.0	-	6.0	7.2
101	9.2	7.4	5.8	-	8.1	9.2

TABLE AVIII.42

SWEAT CHLORIDE: FLIGHT 1
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	18	33	18	-	22	22
2	43	52	-	-	-	18
3	26	41	21	-	36	35
4	24	53	27	-	43	43
5	41	51	30	-	-	29
6	34	53	20	-	42	28
7	19	31	16	-	23	16
8	15	18	10	-	27	17
9	42	50	21	-	40	33
10	28	56	28	-	37	28
11	31	46	33	-	47	38
12	38	43	27	-	25	31
13	29	42	64	-	-	-
14	41	53	53	-	47	48
15	16	19	31	-	-	-
16	30	39	63	-	-	-
17	54	-	62	-	73	56
18	41	48	34	-	39	28
19	19	28	26	-	28	-
20	25	39	25	-	-	-
21	35	43	32	-	46	42
22	32	39	29	-	28	26
90	14	20	17	-	11	12
91	28	39	36	-	22	22
92	-	30	33	-	20	24

TABLE AVIII.43

SWEAT CHLORIDE: FLIGHT 2
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	39	56	30	-	39	37
24	25	33	24	-	-	-
25	33	56	36	-	41	46
26	24	29	21	-	28	24
27	16	-	17	-	22	14
28	29	35	32	-	43	27
29	73	84	57	-	100	76
30	-	40	28	-	43	30

TABLE AVIII.43 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
31	29	47	23	-	32	22
32	31	41	22	-	30	21
33	29	25	34	-	30	28
34	40	51	30	-	48	47
35	36	41	43	-	55	43
36	56	65	53	-	86	88
37	20	20	38	-	33	28
38	32	41	55	-	57	27
39	14	16	19	-	-	-
40	-	-	-	-	29	23
41	28	37	-	-	-	15
42	23	39	35	-	37	35
43	30	40	30	-	29	20
44	44	73	44	-	67	45
93	28	-	-	-	-	-
94	17	20	25	-	21	15
95	17	32	22	-	26	20
102	-	-	-	-	-	19

TABLE AVIII.44

SWEAT CHLORIDE: FLIGHT 3
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	54	51	40	-	60	54
46	43	34	43	-	73	59
47	33	43	23	-	59	43
48	25	39	28	-	35	23
49	25	39	25	-	45	24
50	22	30	25	-	42	22
51	30	50	28	-	38	21
52	28	38	18	-	37	31
53	23	45	26	-	31	19
54	33	48	27	-	46	28
55	49	43	43	-	53	24
56	39	60	33	-	52	42
57	48	48	46	-	57	30
58	36	-	-	-	52	36
59	-	-	41	-	56	28
60	38	49	61	-	53	42
61	24	33	39	-	33	23
62	29	52	47	-	62	41
63	48	62	52	-	89	42
64	52	66	30	-	69	48

TABLE AVIII.44 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
65	29	53	27	-	53	27
66	27	31	28	-	33	15
96	29	24	23	-	32	20
97	31	43	49	-	63	41
98	46	45	33	-	33	23

TABLE AVIII.45

SWEAT CHLORIDE: FLIGHT 4
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	22	31	22	-	29	28
68	19	49	-	-	38	-
69	30	49	37	-	53	38
70	46	54	37	-	60	46
71	36	51	44	-	60	36
72	13	26	22	-	27	18
73	18	25	21	-	-	-
74	47	30	28	-	43	31
75	30	31	27	-	39	23
76	20	33	33	-	39	23
77	66	56	-	-	-	-
78	29	48	32	-	61	51
79	43	74	64	-	49	31
80	27	43	53	-	41	31
81	41	47	67	-	68	44
82	-	28	56	-	-	11
83	18	28	37	-	33	21
84	16	16	32	-	16	14
85	53	60	43	-	64	49
86	29	30	33	-	34	24
87	19	30	-	-	-	-
88	29	34	-	-	-	-
99	15	13	20	-	19	23
100	18	19	19	-	23	22
101	27	25	27	-	29	29

TABLE AVIII.46

SWEAT CREATININE: FLIGHT 1
(mg 1100ml)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	0.18	0.11	0.28	-	0.36	0.32
2	0.30	0.13	-	-	-	0.13
3	0.34	0.20	0.30	-	0.44	0.30
4	0.14	0.15	0.52	-	0.38	0.17
5	0.34	0.11	0.32	-	-	0.22
6	0.26	0.13	0.20	-	0.18	0.22
7	0.30	0.22	0.34	-	0.14	0.18
8	0.24	0.26	0.24	-	0.18	0.24
9	0.24	0.22	0.33	-	0.47	0.38
10	0.18	0.15	0.50	-	0.32	0.32
11	0.53	0.24	0.37	-	0.22	0.53
12	0.59	0.34	0.58	-	0.39	0.60
13	(0.38)	0.41	0.92	-	-	-
14	(0.38)	(0.23)	0.52	-	-	-
15	0.30	0.30	0.26	-	-	-
16	0.78	0.60	0.86	-	-	-
17	0.55	(0.23)	0.38	-	-	0.36
18	0.78	0.38	-	-	0.40	0.28
19	0.34	0.26	0.14	-	0.04	-
20	0.34	0.16	0.16	-	-	-
21	0.53	0.07	0.37	-	0.47	0.42
22	0.40	0.09	0.51	-	0.26	0.30
90	0.34	0.05	0.18	-	0.11	0.13
91	0.52	0.02	0.18	-	0.34	0.18
92	(0.30)	0.00	0.16	-	(0.22)	0.33

TABLE AVIII.47

SWEAT CREATININE: FLIGHT 2
(mg 1100ml)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	0.30	0.09	0.30	-	0.32	0.36
24	(0.33)	0.15	0.38	-	-	-
25	0.37	0.13	0.34	-	0.26	0.22
26	0.34	0.80	0.31	-	0.54	0.36
27	0.20	(0.28)	(0.33)	-	0.10	0.20
28	0.38	0.08	0.63	-	0.47	0.36
29	0.32	0.18	0.34	-	0.18	0.34
30	(0.33)	0.18	0.33	-	(0.18)	0.34

TABLE AVIII.47 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
31	0.20	0.15	0.52	-	0.13	0.24
32	0.28	0.06	0.02	-	0.09	0.24
33	0.22	0.14	(0.60)	-	0.18	0.20
34	0.26	0.19	0.81	-	0.16	0.36
35	0.59	0.32	0.34	-	0.34	0.34
36	0.24	0.14	0.11	-	0.22	0.18
37	0.54	0.48	0.70	-	0.34	-
38	0.39	0.38	0.18	-	0.09	0.11
39	0.20	0.20	0.16	-	-	-
40	(0.33)	(0.28)	-	-	0.20	0.34
41	(0.33)	0.63	-	-	-	-
42	(0.33)	(0.28)	-	-	-	1.60
43	0.43	0.52	0.38	-	0.18	0.38
44	(0.33)	0.38	0.50	-	0.16	0.37
93	(0.30)	-	-	-	-	-
94	0.54	0.32	0.28	-	0.72	0.30
95	0.16	0.22	0.22	-	0.47	0.34
102	-	-	-	-	-	0.15

TABLE AVIII.48

SWEAT CREATININE: FLIGHT 3
(mg 1100ml)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	(0.29)	0.28	-	-	0.30	0.66
46	0.61	0.09	0.45	-	0.39	0.82
47	0.12	0.11	0.29	-	0.09	0.18
48	0.42	0.16	0.49	-	0.40	0.38
49	0.36	0.16	0.20	-	0.13	0.26
50	0.36	0.24	0.29	-	0.09	0.22
51	0.28	0.34	0.34	-	0.28	0.30
52	0.30	0.13	0.12	-	0.09	0.09
53	0.26	0.03	0.29	-	0.16	0.13
54	0.20	0.10	0.40	-	0.18	0.16
55	0.18	0.15	0.34	-	0.10	0.15
56	0.16	0.22	0.27	-	0.11	0.09
57	0.39	0.18	0.58	-	0.05	0.13
58	0.24	(0.18)	-	-	0.03	0.11
59	(0.29)	(0.18)	-	-	-	0.38
60	0.14	0.18	0.31	-	0.04	0.30
61	(0.29)	0.30	-	-	0.16	-
62	0.24	0.17	0.54	-	0.09	0.51
63	(0.29)	0.38	0.76	-	0.86	0.48
64	0.32	0.16	0.88	-	0.18	0.26
65	0.30	0.11	0.38	-	0.13	0.24

TABLE AVIII.48 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
66	0.42	0.07	0.56	-	0.36	0.18
96	0.24	0.10	0.24	-	0.62	0.51
97	0.13	0.40	0.20	-	0.34	0.16
98	0.44	0.18	0.22	-	0.32	0.20

TABLE AVIII.49

SWEAT CREATININE: FLIGHT 4
(mg 1100ml)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	0.36	0.11	0.38	-	0.20	0.28
68	0.26	(0.23)	-	-	-	-
69	0.14	0.20	0.29	-	0.15	0.11
70	0.47	0.07	0.45	-	0.07	0.26
71	0.10	0.06	0.40	-	0.15	0.28
72	0.10	0.11	0.34	-	0.07	0.51
73	0.15	0.76	0.16	-	-	-
74	0.20	0.04	0.33	-	0.06	0.11
75	0.31	0.06	0.50	-	0.22	0.11
76	0.26	0.31	0.50	-	0.35	0.09
77	0.59	0.44	-	-	-	-
78	0.20	0.14	0.89	-	0.02	0.42
79	0.22	(0.23)	0.30	-	0.74	0.16
80	0.36	0.28	0.50	-	0.24	0.30
81	0.32	0.34	0.78	-	0.32	0.50
82	(0.26)	0.32	0.74	-	-	0.15
83	0.30	(0.23)	1.05	-	0.54	0.51
84	0.24	0.24	-	-	0.20	0.16
85	0.26	0.16	0.30	-	0.09	0.08
86	0.30	0.09	0.70	-	0.20	0.51
87	0.39	0.38	-	-	-	0.24
88	0.48	0.28	-	-	-	-
99	0.41	0.14	0.54	-	0.46	(0.54)
100	0.10	0.00	0.14	-	0.22	0.26
101	0.15	0.00	0.10	-	0.26	0.51

TABLE AVIII.50

SWEAT UREA NITROGEN: FLIGHT 1
(mMol/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	6.57	17.71	19.83	-	16.57	14.86
2	13.26	17.60	-	-	-	12.00
3	12.64	13.71	18.28	-	13.26	18.74
4	7.71	18.74	22.11	-	13.26	17.14
5	17.14	17.71	12.63	-	-	20.97
6	16.00	23.14	17.71	-	17.71	20.97
7	16.57	26.57	19.83	-	15.43	20.40
8	10.97	8.74	10.97	-	11.43	19.26
9	7.71	10.97	17.71	-	12.62	18.74
10	8.57	9.88	22.11	-	22.11	19.83
11	13.71	16.57	26.57	-	18.28	26.57
12	21.54	20.40	30.68	-	18.74	31.23
13	23.71	26.57	33.46	-	-	-
14	21.54	22.63	21.54	-	23.14	31.23
15	14.28	20.97	18.74	-	-	-
16	22.11	19.82	22.11	-	-	-
17	20.40	-	23.14	-	21.54	24.86
18	19.26	14.28	26.00	-	23.71	21.54
19	11.43	13.71	18.74	-	13.26	-
20	15.14	18.74	17.14	-	-	-
21	-	22.11	22.11	-	19.83	24.86
22	17.14	20.86	20.97	-	20.97	20.97
90	18.86	12.00	17.71	-	14.86	19.83
91	14.57	15.43	19.26	-	22.63	17.14
92	-	14.28	13.26	-	20.97	18.74

TABLE AVIII.51

SWEAT UREA NITROGEN: FLIGHT 2
(mMol/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	13.72	18.74	29.00	-	15.43	18.28
24	18.28	14.86	27.14	-	-	-
25	14.86	23.14	26.57	-	18.74	21.54
26	17.14	18.28	26.00	-	24.28	25.43
27	14.86	-	31.23	-	19.83	23.71
28	24.00	25.31	26.57	-	31.23	31.23
29	12.57	16.57	25.43	-	16.57	19.83
30	-	18.28	19.83	-	16.57	23.14
31	13.71	14.86	25.43	-	11.43	18.28
32	16.00	22.11	23.14	-	14.28	17.71
33	11.71	16.00	31.23	-	17.14	14.28
34	14.86	18.74	32.34	-	16.00	15.43

TABLE AVIII.51 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II *	REC I	REC II
35	18.86	22.63	20.40	-	17.14	26.57
36	13.14	13.26	15.43	-	13.26	22.62
37	19.43	27.66	30.68	-	21.54	29.00
38	17.14	20.86	19.82	-	12.63	14.86
39	11.43	14.86	22.11	-	-	-
40	22.85	-	-	-	13.71	19.26
41	22.28	29.00	-	-	-	17.71
42	26.28	33.46	31.23	-	24.86	30.11
43	22.86	31.23	26.57	-	21.54	20.97
44	23.43	27.66	31.23	-	21.54	24.28
93	19.43	-	-	-	-	-
94	16.86	12.63	10.46	-	12.63	13.26
95	17.14	19.83	16.57	-	12.63	21.54
102	-	-	-	-	-	17.71

TABLE AVIII.52

SWEAT UREA NITROGEN: FLIGHT 3
(mMol/L)

Subject Code No.	P I	P II	EXP I	EXP II *	REC I	REC II
45	26.28	22.11	31.23	-	17.71	23.14
46	16.00	12.00	13.26	-	22.63	20.97
47	8.57	10.00	18.74	-	14.28	13.71
48	22.28	18.74	27.66	-	20.97	22.11
49	19.43	14.28	18.28	-	13.26	12.00
50	18.28	18.28	18.74	-	13.71	10.97
51	24.00	19.83	19.83	-	16.00	15.43
52	16.57	11.73	10.46	-	10.00	11.43
53	17.14	13.26	27.66	-	14.28	12.00
54	14.86	17.71	22.11	-	14.86	13.71
55	17.14	10.94	26.57	-	13.26	18.28
56	13.71	12.63	19.26	-	16.57	15.43
57	13.71	13.26	17.14	-	8.57	10.97
58	17.14	-	-	-	8.57	16.00
59	-	-	-	-	21.14	17.71
60	9.14	10.97	12.28	-	12.62	13.26
61	-	12.00	-	-	15.43	24.28
62	12.57	10.97	14.86	-	12.00	17.71
63	-	13.71	27.66	-	23.71	17.14
64	18.86	18.74	27.14	-	14.28	20.40
65	15.43	10.97	16.57	-	10.46	19.83
66	17.14	15.43	27.66	-	14.28	19.26
96	17.54	16.57	10.46	-	15.43	13.26
97	9.43	13.26	10.00	-	10.97	12.00
98	17.71	13.71	12.63	-	13.26	12.63

TABLE AVIII.53

SWEAT UREA NITROGEN: FLIGHT 4
(mMol/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	-	18.97	21.54	-	15.43	22.63
68	21.71	19.26	-	-	18.28	-
69	18.86	23.14	20.97	-	10.97	17.71
70	21.71	16.00	31.23	-	14.28	17.71
71	15.71	12.00	24.28	-	12.63	18.74
72	14.57	19.83	26.57	-	11.42	17.14
73	11.14	15.43	17.71	-	-	-
74	27.43	20.97	24.86	-	13.71	16.57
75	14.57	23.14	31.23	-	10.97	15.43
76	18.86	19.83	32.34	-	14.86	23.14
77	20.57	21.54	-	-	-	-
78	12.86	14.86	33.46	-	12.63	19.83
79	20.00	33.46	30.11	-	24.28	19.26
80	17.71	24.86	31.23	-	22.11	22.11
81	20.00	26.57	32.34	-	21.14	30.68
82	-	27.14	31.23	-	-	17.71
83	18.00	-	24.86	-	27.66	31.23
84	22.28	23.14	31.23	-	20.40	21.54
85	14.57	17.14	24.86	-	13.26	17.71
86	16.80	17.71	26.57	-	18.28	25.43
87	16.86	17.71	-	-	-	16.57
88	22.86	18.97	-	-	-	-
99	10.00	14.28	19.83	-	14.28	-
100	16.17	11.43	13.26	-	11.43	13.71
101	11.43	-	8.57	-	11.43	13.71

TABLE AVIII.54

SWEAT AMMONIA: FLIGHT 1
(mMol/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	3.29	8.86	9.92	-	8.29	7.43
2	6.63	8.80	-	-	-	6.00
3	6.32	6.86	9.15	-	6.63	9.37
4	3.86	9.37	11.06	-	6.63	8.57
5	8.57	8.86	6.32	-	-	10.49
6	8.00	11.58	8.86	-	8.86	10.49
7	8.29	13.29	9.92	-	7.72	10.20
8	5.49	4.37	5.49	-	5.72	9.63

TABLE AVIII.54 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
9	3.86	5.49	8.86	-	6.32	9.37
10	4.29	4.94	11.06	-	11.06	9.92
11	6.86	8.29	13.29	-	9.15	13.29
12	10.77	10.20	15.35	-	9.37	15.62
13	11.86	13.29	16.73	-	-	-
14	10.78	11.32	10.78	-	11.58	15.62
15	7.14	10.49	9.37	-	-	-
16	11.06	9.92	11.06	-	-	-
17	10.20	-	11.58	-	11.78	12.43
18	9.63	7.14	13.00	-	11.86	11.78
19	5.72	6.86	9.37	-	6.63	-
20	7.57	9.37	8.57	-	-	-
21	-	11.06	11.06	-	9.92	12.43
22	8.57	10.43	10.49	-	10.49	10.49
90	9.43	6.00	8.86	-	7.43	9.92
91	7.29	7.72	9.63	-	11.32	8.57
92	-	7.14	6.63	-	10.49	9.37

TABLE AVIII.55

SWEAT AMMONIA: FLIGHT 2
(mMol/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	6.86	9.37	14.50	-	7.72	9.15
24	9.15	7.43	13.58	-	-	-
25	7.43	11.58	13.29	-	9.37	10.78
26	8.57	9.15	13.00	-	12.15	12.72
27	7.43	-	15.62	-	9.92	11.86
28	12.00	12.66	13.29	-	15.62	15.62
29	6.29	8.29	12.72	-	8.29	9.92
30	-	9.15	9.92	-	8.29	11.58
31	6.86	7.43	12.72	-	5.72	9.14
32	8.00	11.06	11.58	-	7.14	8.86
33	5.86	8.00	15.62	-	8.57	7.14
34	7.43	9.37	16.18	-	8.00	7.72
35	9.43	11.32	10.20	-	8.57	13.29
36	6.57	6.63	7.72	-	6.63	11.32
37	9.72	13.83	15.35	-	10.78	14.50
38	8.57	10.43	9.92	-	6.32	7.43
39	5.72	7.43	11.06	-	-	-
40	11.43	-	-	-	6.86	9.63
41	11.15	14.50	-	-	-	8.86
42	13.15	16.73	15.62	-	12.43	15.06

TABLE AVIII.55 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
43	11.43	15.62	13.29	-	10.78	10.49
44	11.72	13.83	15.62	-	10.78	12.15
93	9.72	-	-	-	-	-
94	8.43	6.32	5.23	-	6.32	6.63
95	8.57	9.92	8.29	-	6.32	10.78
102	-	-	-	-	-	8.86

TABLE AVIII.56

SWEAT AMMONIA: FLIGHT 3
(mMol/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	13.15	11.06	15.62	-	8.86	11.58
46	8.00	6.00	6.63	-	11.32	10.49
47	4.29	5.00	9.37	-	7.14	6.86
48	11.15	9.37	13.83	-	10.49	11.06
49	9.72	7.14	9.15	-	6.63	6.00
50	9.15	9.15	9.37	-	6.86	5.49
51	12.00	9.92	9.92	-	8.00	7.72
52	8.29	5.72	5.23	-	5.00	5.72
53	8.57	6.63	13.83	-	7.14	6.00
54	7.43	8.86	11.06	-	7.43	6.86
55	8.57	5.47	13.29	-	6.63	9.15
56	6.86	6.32	9.63	-	8.29	7.72
57	6.86	6.63	8.57	-	4.29	5.49
58	8.57	-	-	-	4.29	8.00
59	-	-	-	-	11.58	8.86
60	4.57	5.49	6.14	-	6.32	6.63
61	-	6.00	-	-	7.72	12.15
62	6.29	5.49	7.43	-	6.00	8.86
63	-	6.86	13.83	-	11.86	8.57
64	9.43	9.37	13.58	-	7.14	10.20
65	7.72	5.49	8.29	-	5.23	9.92
66	8.57	7.72	13.83	-	7.14	9.32
96	8.77	8.29	5.23	-	7.72	6.63
97	4.72	6.63	5.00	-	5.49	6.00
98	8.86	6.86	6.32	-	6.63	6.32

TABLE AVIII.57

SWEAT AMMONIA: FLIGHT 4
(mMol/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	-	9.49	10.78	-	7.72	11.32
68	10.86	9.63	-	-	9.15	-
69	9.43	11.58	10.49	-	5.49	8.86
70	10.86	8.00	15.62	-	7.14	8.86
71	7.86	6.00	12.15	-	6.32	9.37
72	7.29	9.92	13.29	-	5.72	8.57
73	5.57	7.72	8.86	-	-	-
74	13.72	10.49	12.43	-	6.86	8.29
75	7.29	11.58	15.62	-	5.49	7.72
76	9.43	9.92	16.18	-	7.43	11.58
77	10.29	10.78	-	-	-	-
78	6.43	7.43	16.73	-	6.32	9.92
79	10.00	16.73	15.06	-	12.15	9.63
80	8.86	12.43	15.62	-	11.06	11.06
81	10.00	13.29	16.18	-	11.58	15.35
82	-	13.58	15.62	-	-	8.86
83	9.00	-	12.43	-	13.83	15.62
84	11.15	11.58	15.62	-	10.20	10.78
85	7.29	8.57	12.43	-	6.63	8.86
86	8.40	8.86	13.29	-	9.15	12.72
87	8.43	8.86	-	-	-	8.29
88	11.43	9.49	-	-	-	-
99	5.00	7.14	9.92	-	7.14	-
100	8.09	5.72	6.63	-	5.72	6.86
101	5.72	-	4.29	-	5.72	6.86

TABLE AVIII.58

SWEAT LACTIC ACID: FLIGHT 1
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	7.0	21.6	22.9	-	17.1	16.9
2	23.5	19.2	-	-	-	21.3
3	22.0	23.4	19.8	-	14.0	21.6
4	12.0	25.1	19.2	-	21.8	16.1
5	27.2	19.7	20.7	-	-	5.7
6	20.4	17.8	17.1	-	13.3	16.1
7	24.0	10.3	26.2	-	22.0	22.0
8	20.4	12.9	20.8	-	22.0	18.2
9	18.2	19.7	18.2	-	22.4	20.3

TABLE AVIII.58 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
10	20.9	20.5	11.1	-	25.5	28.7
11	24.6	24.0	30.2	-	17.6	25.0
12	30.6	30.2	19.8	-	28.1	24.5
13	33.3	33.9	22.9	-	-	-
14	33.5	33.9	27.1	-	27.1	29.3
15	28.5	30.2	31.1	-	-	-
16	33.5	28.1	33.9	-	-	-
17	14.1	-	28.7	-	13.7	15.5
18	24.6	32.9	28.1	-	22.6	29.2
19	18.3	20.6	24.5	-	15.5	-
20	20.2	9.7	23.4	-	-	-
21	6.0	8.7	28.7	-	27.1	20.3
22	28.5	9.2	28.1	-	24.0	-
90	8.1	10.1	20.6	-	16.7	22.3
91	26.2	17.2	13.6	-	26.6	8.7
92	-	14.6	9.4	-	25.6	2.5

TABLE AVIII.59

SWEAT LACTIC ACID: FLIGHT 2
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	21.8	7.7	25.5	-	25.7	17.6
24	22.0	8.9	18.5	-	-	-
25	25.5	10.0	18.7	-	21.4	14.6
26	28.7	11.9	21.3	-	24.6	17.5
27	23.9	-	3.0	-	20.9	16.6
28	33.9	11.1	33.9	-	28.8	20.8
29	25.5	7.9	27.2	-	22.5	17.3
30	-	9.0	32.9	-	28.2	14.6
31	22.9	7.4	18.8	-	16.1	14.6
32	25.5	10.9	19.1	-	17.6	26.2
33	20.3	8.2	13.4	-	18.2	27.1
34	18.2	8.5	27.1	-	14.3	24.5
35	11.3	5.0	24.6	-	20.9	25.9
36	20.5	8.0	13.9	-	17.6	23.0
37	19.7	14.5	33.9	-	13.8	33.9
38	26.4	9.6	25.7	-	12.4	17.6
39	24.5	9.8	22.3	-	-	-
40	15.0	-	-	-	14.3	15.9
41	5.4	16.6	-	-	-	23.9
42	13.0	-	33.9	-	12.9	17.6
43	7.9	30.4	23.2	-	19.2	23.4
44	5.2	33.9	25.6	-	15.0	33.9

TABLE AVIII.59 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II *	REC I	REC II
93	26.0	-	-	-	-	-
94	31.2	17.4	19.8	-	5.2	13.0
95	19.6	25.6	14.6	-	14.1	7.5
102	-	-	-	-	-	22.0

TABLE AVIII.60

SWEAT LACTIC ACID: FLIGHT 3
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II *	REC I	REC II
45	15.1	31.8	10.3	-	3.0	33.9
46	23.0	19.4	23.4	-	14.2	33.5
47	13.0	12.9	16.7	-	14.5	10.1
48	29.8	18.5	19.5	-	22.4	20.8
49	22.0	17.3	26.6	-	18.8	16.7
50	12.7	17.6	28.7	-	19.8	11.4
51	22.8	33.4	33.9	-	30.2	16.6
52	9.4	17.3	20.8	-	12.4	9.0
53	14.1	15.0	3.5	-	18.7	17.4
54	25.8	22.4	13.8	-	22.4	21.3
55	25.1	17.3	20.8	-	21.8	25.0
56	18.6	10.0	13.8	-	7.1	13.4
57	31.0	19.5	15.0	-	14.0	24.8
58	25.6	-	-	-	5.6	20.3
59	-	-	-	-	33.9	21.3
60	13.0	14.2	14.0	-	13.6	20.3
61	27.7	33.9	-	-	13.2	32.3
62	22.7	23.5	14.0	-	19.7	33.8
63	33.5	33.9	33.9	-	33.9	33.9
64	29.8	10.3	29.2	-	15.0	15.0
65	28.6	6.7	25.0	-	20.8	14.9
66	33.3	12.7	33.9	-	33.9	18.3
96	22.8	14.6	23.0	-	11.4	15.6
97	11.4	9.1	13.8	-	18.8	8.1
98	23.5	14.9	18.8	-	8.3	14.7

TABLE AVIII.61

SWEAT LACTIC ACID: FLIGHT 4
(mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II *	REC I	REC II
67	20.5	25.7	22.4	-	12.9	10.3
68	20.6	-	-	-	14.0	-
69	14.6	29.3	18.0	-	14.1	7.1
70	27.2	19.8	17.1	-	11.3	9.2
71	16.5	16.7	26.2	-	10.4	12.5
72	19.3	29.9	13.2	-	15.0	23.0
73	16.9	20.9	3.8	-	-	-
74	30.1	22.7	0.2	-	8.2	15.2
75	18.2	21.4	3.6	-	9.2	11.2
76	18.6	22.0	3.0	-	9.8	17.8
77	30.9	31.0	-	-	-	-
78	18.3	18.8	4.7	-	11.9	24.0
79	29.9	-	5.8	-	11.1	24.6
80	20.4	27.2	6.2	-	13.0	23.0
81	23.0	33.9	5.8	-	12.4	13.6
82	-	33.8	5.6	-	-	11.2
83	24.7	32.4	5.8	-	17.6	27.2
84	25.6	29.3	20.3	-	15.4	18.8
85	18.3	18.8	11.3	-	12.9	5.2
86	21.4	27.2	17.8	-	20.3	20.4
87	20.5	22.0	-	-	-	17.2
88	22.2	22.8	-	-	-	-
99	20.1	9.8	33.5	-	25.6	11.1
100	19.8	11.4	16.2	-	15.4	8.8
101	20.3	11.4	17.2	-	16.2	18.1

TABLE AVIII.62

SWEAT OSMOLARITY (BY FISKE): FLIGHT 1
(mosm/L)

Subject Code No.	P I	P II	EXP I	EXP II *	REC I	REC II
1	51	133	100	-	105	109
2	153	172	-	-	-	109
3	115	147	105	-	124	142
4	76	179	127	-	144	126
5	156	169	106	-	-	113
6	130	166	97	-	140	126
7	108	192	116	-	94	89
8	85	85	66	-	98	88
9	125	151	95	-	147	122
10	113	168	128	-	157	129
11	127	189	152	-	149	162

TABLE AVIII.62 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
12	178	186	146	-	116	162
13	205	222	341	-	-	-
14	267	256	198	-	191	278
15	93	130	115	-	-	-
16	188	263	265	-	-	-
17	185	-	226	-	226	194
18	111	195	199	-	172	152
19	87	114	120	-	92	-
20	113	145	119	-	-	-
21	153	178	159	-	190	173
22	147	189	157	-	139	112
90	86	84	88	-	69	88
91	123	138	131	-	121	98
92	148	105	112	-	123	128

TABLE AVIII.63

SWEAT OSMOLARITY (BY FISKE): FLIGHT 2
(mosm/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	142	180	189	-	144	151
24	142	176	153	-	-	-
25	147	196	184	-	159	132
26	132	171	147	-	167	147
27	100	-	117	-	105	109
28	198	200	239	-	261	184
29	206	230	199	-	258	204
30	-	170	171	-	164	133
31	125	151	128	-	108	95
32	144	182	111	-	104	115
33	117	121	225	-	127	126
34	147	191	187	-	160	188
35	168	187	187	-	198	202
36	176	196	150	-	223	241
37	155	218	278	-	148	241
38	135	169	183	-	169	114
39	87	96	112	-	-	-
40	223	-	-	-	116	111
41	223	293	-	-	-	133
42	149	276	307	-	183	236
43	145	280	224	-	142	136
44	198	285	178	-	210	182
93	169	-	-	-	-	-
94	113	93	97	-	92	85
95	100	137	109	-	117	140
102	-	-	-	-	-	108

TABLE AVIII.64

SWEAT OSMOLARITY (BY FISKE): FLIGHT 3
(mosm/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	304	201	243	-	197	226
46	179	125	174	-	201	241
47	98	128	112	-	160	130
48	191	164	164	-	183	136
49	195	150	133	-	139	107
50	128	135	144	-	131	108
51	208	219	190	-	152	124
52	131	127	100	-	108	109
53	130	135	162	-	126	87
54	138	174	124	-	148	100
55	167	150	167	-	149	112
56	127	161	114	-	142	123
57	178	154	153	-	159	111
58	145	-	-	-	135	129
59	-	-	-	-	326	177
60	119	132	159	-	140	132
61	182	179	328	-	132	170
62	119	169	165	-	176	162
63	283	272	262	-	339	172
64	179	210	200	-	189	171
65	137	168	130	-	151	120
66	152	149	191	-	141	107
96	146	115	102	-	122	103
97	148	133	143	-	172	123
98	176	145	134	-	111	92

TABLE AVIII.65

SWEAT OSMOLARITY (BY FISKE): FLIGHT 4
(mosm/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	135	165	147	-	136	147
68	120	220	-	-	164	-
69	117	197	168	-	155	137
70	199	171	168	-	172	163
71	111	153	180	-	157	129
72	86	155	149	-	119	126
73	90	131	128	-	-	-
74	217	147	112	-	145	128
75	94	141	177	-	132	92

TABLE AVIII.65 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
76	113	142	204	-	140	122
77	264	226	-	-	-	-
78	124	163	231	-	183	197
79	235	374	301	-	220	154
80	125	214	201	-	158	164
81	142	223	269	-	214	194
82	-	197	304	-	-	84
83	130	261	327	-	190	170
84	126	125	298	-	109	111
85	155	179	171	-	167	155
86	128	146	206	-	145	162
87	114	134	-	-	-	110
88	142	155	-	-	-	-
99	129	104	178	-	111	204
100	101	87	91	-	92	103
101	113	93	99	-	115	116

TABLE AVIII.66

PER CENT OF SWEAT OSMOLARITY CONTRIBUTED
BY MAJOR CONSTITUENTS: FLIGHT 1
(Na, K, Cl, Lactic Acid, Ammonia, Urea)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	110	97	105	-	87	89
2	94	95	-	-	-	83
3	96	96	102	-	93	93
4	105	100	94	-	94	109
5	97	97	109	-	-	103
6	89	103	102	-	90	91
7	90	72	91	-	99	106
8	96	85	106	-	101	102
9	101	100	101	-	88	99
10	97	98	88	-	91	105
11	94	85	99	-	97	94
12	86	87	81	-	97	89
13	67	73	64	-	-	-
14	65	86	92	-	91	75
15	99	86	108	-	-	-
16	81	66	81	-	-	-
17	90	-	85	-	89	97
18	147	90	70	-	88	91
19	97	100	89	-	102	-
20	95	92	86	-	-	-
21	-	83	86	-	85	94
22	89	75	79	-	87	-
90	-	89	102	-	102	96
91	98	94	93	-	97	86
92	-	97	92	-	88	71

TABLE AVIII.67

PER CENT OF SWEAT OSMOLARITY CONTRIBUTED
BY MAJOR CONSTITUENTS: FLIGHT 2
(Na,K,Cl, Lactic Acid, Ammonia, Urea)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	88	89	80	-	92	93
24	90	70	90	-	-	-
25	91	92	81	-	90	122
26	91	69	77	-	77	83
27	91	-	84	-	94	91
28	77	72	69	-	70	85
29	94	99	89	-	99	110
30	-	81	84	-	91	96
31	91	96	93	-	91	104
32	90	79	94	-	95	97
33	90	78	66	-	86	94
34	92	82	82	-	89	85
35	81	76	84	-	87	87
36	98	90	103	-	99	102
37	70	62	70	-	85	66
38	100	82	98	-	94	94
39	93	80	93	-	-	-
40	-	-	-	-	84	93
41	53	60	-	-	-	75
42	76	-	58	-	76	66
43	74	69	65	-	82	84
44	72	88	96	-	90	95
93	76	-	-	-	-	-
94	95	96	98	-	83	89
95	99	93	85	-	81	67
102	-	-	-	-	-	91

TABLE AVIII.68

PER CENT OF SWEAT OSMOLARITY CONTRIBUTED
BY MAJOR CONSTITUENTS: FLIGHT 3
(Na,K,Cl, Lactic Acid, Ammonia, Urea)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	62	91	62	-	81	85
46	84	97	82	-	99	83
47	104	99	87	-	103	98
48	75	88	80	-	78	84
49	63	91	92	-	99	88
50	79	91	85	-	100	76
51	75	89	78	-	97	73
52	80	101	89	-	98	85

TABLE AVIII.68 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
53	81	102	73	-	89	93
54	95	93	88	-	99	102
55	100	88	95	-	107	93
56	105	102	120	-	98	106
57	94	99	93	-	91	95
58	99	-	-	-	95	91
59	-	-	-	-	65	69
60	94	106	102	-	105	96
61	-	78	-	-	84	77
62	97	97	86	-	85	96
63	-	78	78	-	80	95
64	101	91	80	-	98	92
65	94	88	88	-	100	92
66	88	81	83	-	97	87
96	93	91	92	-	94	85
97	68	97	97	-	101	101
98	93	95	85	-	95	94

TABLE AVIII.69

PER CENT OF SWEAT OSMOLARITY CONTRIBUTED
BY MAJOR CONSTITUENTS: FLIGHT 4
(Na,K,Cl, Lactic Acid, Ammonia, Urea)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	-	84	74	-	78	79
68	89	-	-	-	74	-
69	99	94	77	-	95	92
70	87	97	85	-	93	89
71	109	96	89	-	101	95
72	100	85	76	-	83	77
73	99	87	67	-	-	-
74	88	88	90	-	86	85
75	111	95	64	-	91	96
76	89	94	75	-	87	91
77	87	94	-	-	-	-
78	88	95	57	-	92	84
79	67	-	67	-	78	83
80	95	84	85	-	89	81
81	97	86	74	-	92	88
82	-	79	63	-	-	89
83	83	-	42	-	76	72
84	89	89	49	-	82	85
85	102	98	84	-	99	87
86	102	87	70	-	90	78

TABLE AVIII.69 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
87	89	89	-	-	-	88
88	93	86	-	-	-	-
99	68	76	75	-	94	-
100	95	88	89	-	97	84
101	99	-	91	-	93	95

TABLE AVIII.70

CONCENTRATION OF SWEAT CATIONS: FLIGHT 1
(Na^+, K^+, NH_4^+; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	24	58	44	-	35	42
2	66	76	-	-	-	38
3	49	64	48	-	52	57
4	37	82	52	-	58	60
5	66	77	52	-	-	50
6	59	76	43	-	52	49
7	37	71	43	-	35	36
8	34	33	28	-	39	36
9	58	69	40	-	55	48
10	51	79	52	-	59	49
11	51	73	59	-	61	65
12	65	69	41	-	40	59
13	51	61	97	-	-	-
14	83	109	80	-	77	101
15	33	41	44	-	-	-
16	64	85	94	-	-	-
17	77	-	80	-	94	89
18	74	81	49	-	65	63
19	36	51	37	-	39	-
20	47	65	38	-	-	-
21	-	76	54	-	71	76
22	53	71	45	-	48	-
90	34	33	35	-	26	31
91	50	57	55	-	47	38
92	-	41	47	-	41	44

TABLE AVIII.71

CONCENTRATION OF SWEAT CATIONS: FLIGHT 2
(Na^+, K^+, NH_4^+; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	66	80	65	-	53	67
24	55	66	60	-	-	-
25	62	89	69	-	60	79
26	51	59	46	-	51	56
27	36	-	47	-	37	45
28	65	74	74	-	83	78
29	91	107	65	-	116	111
30	-	71	63	-	61	60
31	49	65	52	-	39	44
32	56	70	41	-	36	47
33	45	45	69	-	47	49
34	63	78	63	-	65	75
35	68	73	68	-	78	80
36	83	90	74	-	103	109
37	49	73	90	-	59	68
38	59	68	80	-	77	47
39	32	35	41	-	-	-
40	-	-	-	-	42	46
41	62	88	-	-	-	44
42	51	-	81	-	62	74
43	46	91	66	-	49	50
44	69	113	68	-	88	69
93	54	-	-	-	-	-
94	37	33	34	-	32	30
95	41	47	33	-	38	41
102	-	-	-	-	-	35

TABLE AVIII.72

CONCENTRATION OF SWEAT CATIONS: FLIGHT 3
(Na^+, K^+, NH_4^+; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	92	78	73	-	80	82
46	69	55	63	-	90	87
47	47	60	38	-	78	60
48	66	68	57	-	65	49
49	58	63	51	-	61	41
50	49	56	51	-	57	37
51	77	91	67	-	62	37
52	51	61	40	-	46	43
53	52	65	60	-	48	32
54	57	73	45	-	64	39

TABLE AVIII.72 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
55	78	59	69	-	70	38
56	62	82	72	-	63	59
57	75	72	64	-	65	40
58	64	-	-	-	62	45
59	-	-	-	-	108	55
60	51	65	74	-	68	52
61	-	62	-	-	50	51
62	51	78	67	-	56	64
63	-	102	91	-	129	70
64	79	97	71	-	87	74
65	56	76	45	-	67	50
66	56	61	68	-	57	40
96	62	44	35	-	52	35
97	46	60	63	-	75	58
98	78	61	45	-	45	32

TABLE AVIII.73

CONCENTRATION OF SWEAT CATIONS: FLIGHT 4
(Na^+, K^+, NH_4^+; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	-	60	43	-	50	55
68	45	-	-	-	50	-
69	53	83	54	-	70	64
70	77	75	58	-	75	69
71	54	68	65	-	75	55
72	40	56	51	-	44	39
73	45	53	44	-	-	-
74	85	58	45	-	60	47
75	41	60	51	-	61	39
76	44	60	57	-	57	47
77	111	102	-	-	-	-
78	50	40	63	-	82	71
79	64	-	101	-	86	53
80	54	83	79	-	65	57
81	53	85	94	-	95	73
82	-	67	101	-	-	35
83	46	-	68	-	68	46
84	47	44	63	-	37	40
85	72	78	63	-	75	64
86	61	52	67	-	58	56
87	45	51	-	-	-	41
88	58	57	-	-	-	-
99	37	48	56	-	42	-
100	37	30	28	-	36	38
101	49	-	33	-	46	44

TABLE AVIII.74

CONCENTRATION OF SWEAT ANIONS: FLIGHT 1
(Cl^-, $Lactate^-$; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	25	53	37	-	36	36
2	65	70	-	-	-	38
3	46	63	39	-	49	56
4	35	76	43	-	61	58
5	66	69	47	-	-	34
6	54	70	34	-	53	44
7	41	41	37	-	41	34
8	35	30	27	-	45	32
9	59	68	38	-	58	52
10	48	76	38	-	58	51
11	54	68	61	-	61	58
12	66	67	45	-	48	51
13	56	74	85	-	-	-
14	73	85	78	-	72	77
15	42	47	56	-	-	-
16	61	65	90	-	-	-
17	67	-	89	-	86	69
18	64	79	60	-	57	55
19	37	47	46	-	42	-
20	44	48	44	-	-	-
21	-	51	59	-	71	62
22	58	48	55	-	47	-
90	-	30	38	-	28	34
91	54	56	50	-	49	31
92	-	45	42	-	46	27

TABLE AVIII.75

CONCENTRATION OF SWEAT ANIONS: FLIGHT 2
(Cl^-, $Lactate^-$; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	59	63	51	-	63	51
24	45	41	41	-	-	-
25	57	65	53	-	61	58
26	51	40	38	-	51	40
27	38	-	19	-	39	29
28	61	45	59	-	66	46
29	97	91	79	-	118	90
30	-	48	55	-	66	42
31	50	54	38	-	45	36
32	56	50	37	-	44	42

TABLE AVIII.75 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
33	45	32	45	-	45	50
34	57	59	52	-	60	70
35	47	46	66	-	74	64
36	75	72	66	-	102	107
37	38	33	70	-	46	60
38	57	50	76	-	69	41
39	37	25	37	-	-	-
40	-	-	-	-	41	39
41	33	52	-	-	-	34
42	35	-	62	-	47	51
43	37	68	49	-	45	39
44	49	106	68	-	81	77
93	52	-	-	-	-	-
94	48	37	45	-	26	28
95	37	58	37	-	40	28
102	-	-	-	-	-	41

TABLE AVIII.76

CONCENTRATION OF SWEAT ANIONS: FLIGHT 3
(Cl^-, $Lactate^-$; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	68	81	50	-	63	86
46	64	52	62	-	85	90
47	45	55	37	-	71	51
48	53	56	46	-	53	40
49	45	55	47	-	60	40
50	34	46	52	-	58	33
51	51	81	55	-	62	36
52	37	54	35	-	47	39
53	36	59	31	-	46	35
54	54	69	38	-	64	45
55	72	59	62	-	71	44
56	57	68	46	-	59	53
57	77	66	60	-	68	53
58	61	-	-	-	57	55
59	-	-	-	-	83	45
60	50	62	74	-	64	61
61	-	65	-	-	44	53
62	50	74	60	-	80	74
63	-	94	79	-	121	69
64	80	76	57	-	81	60
65	56	59	50	-	70	41
66	68	43	55	-	60	30
96	52	39	46	-	43	36
97	42	52	63	-	82	49
98	70	60	52	-	41	38

TABLE AVIII.77

CONCENTRATION OF SWEAT ANIONS: FLIGHT 4
(Cl^-, $Lactate^-$; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	-	55	40	-	39	36
68	38	-	-	-	-	-
69	44	76	52	-	64	45
70	71	72	51	-	69	53
71	51	66	65	-	68	48
72	31	54	33	-	39	37
73	34	44	24	-	-	-
74	75	51	30	-	50	43
75	47	51	30	-	46	31
76	37	53	35	-	47	40
77	91	85	-	-	-	-
78	46	38	36	-	72	71
79	71	-	-	-	58	55
80	46	68	59	-	52	52
81	62	79	72	-	78	55
82	-	59	61	-	-	20
83	41	-	42	-	47	43
84	40	43	48	-	28	31
85	70	77	52	-	74	53
86	49	54	47	-	50	41
87	39	50	-	-	-	37
88	50	55	-	-	-	-
99	35	23	54	-	45	34
100	38	30	35	-	38	31
101	47	36	44	-	45	47

TABLE AVIII.78

IONIC BALANCE OF SWEAT: FLIGHT 1
(Cations minus Anions; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
1	-1	+5	+5	-	-1	+6
2	+1	+6	-	-	-	0
3	+3	+1	+9	-	+3	+1
4	+2	+6	+9	-	-3	+2
5	0	+8	+5	-	-	+16
6	+5	+6	+9	-	-1	+5
7	-4	+30	+6	-	-6	+2
8	-1	+3	+1	-	-6	+4
9	-1	+1	+2	-	-3	-4

TABLE AVIII.78 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
10	+ 3	+ 3	+14	-	+ 1	- 2
11	- 3	+ 5	- 2	-	0	+ 7
12	- 1	+ 2	- 4	-	- 8	+ 8
13	- 5	-13	+12	-	-	-
14	+10	+24	+ 2	-	+ 5	+24
15	- 9	- 6	-12	-	-	-
16	+ 3	+20	+ 4	-	-	-
17	+10	-	- 9	-	+ 8	+20
18	+10	+ 2	-11	-	+ 8	+ 8
19	- 1	+ 4	- 9	-	- 3	-
20	+ 3	+13	- 6	-	-	-
21	-	+25	- 5	-	0	+14
22	- 5	+23	-10	-	+ 1	-
90	-	+ 3	- 3	-	- 2	- 3
91	- 4	+ 1	+ 5	-	- 2	+ 7
92	-	- 4	+ 5	-	- 5	+17

TABLE AVIII.79

IONIC BALANCE OF SWEAT: FLIGHT 2
(Cations minus Anions; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
23	+ 7	+17	+11	-	-10	+16
24	+10	+25	+19	-	-	-
25	+ 5	+24	+16	-	- 1	+21
26	0	+19	+ 8	-	0	+16
27	- 2	-	+28	-	- 2	+16
28	+ 4	+29	+13	-	+17	+32
29	- 6	+16	-14	-	- 2	+21
30	-	+23	+ 8	-	- 5	+18
31	- 1	+11	+14	-	- 6	+ 8
32	0	+20	+ 4	-	- 8	+ 5
33	0	+13	+24	-	+ 2	- 1
34	+ 6	+19	+11	-	+ 5	+ 5
35	+21	+27	+ 2	-	+ 4	+16
36	+ 8	+18	+ 8	-	+ 1	+ 2
37	+11	+40	+20	-	+13	+ 8
38	+ 2	+18	+ 4	-	+ 8	+ 6
39	- 5	+10	+ 4	-	-	-
40	-	-	-	-	+ 1	+ 7
41	+29	+36	-	-	-	+10
42	+16	-	+19	-	+15	+23
43	+ 9	+23	+17	-	+ 4	+11
44	+20	+ 7	0	-	+ 7	- 8

TABLE AVIII.79 (Contd)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
93	+ 2	-	-	-	-	-
94	-11	- 4	-11	-	+ 6	+ 2
95	+ 4	-11	- 4	-	- 2	+13
102	-	-	-	-	-	- 6

TABLE AVIII.80

IONIC BALANCE OF SWEAT: FLIGHT 3
(Cations minus Anions; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
45	+24	- 3	+23	-	+17	- 4
46	+ 5	+ 3	+ 1	-	+ 5	- 3
47	+ 2	+ 5	+ 1	-	+ 7	+ 9
48	+13	+12	+11	-	+12	+ 9
49	+13	+ 8	+ 4	-	+ 1	+ 1
50	+15	+10	- 1	-	- 1	+ 4
51	+26	+10	+12	-	0	+ 1
52	+14	+ 7	+ 5	-	- 1	+ 4
53	+16	+ 6	+29	-	+ 2	- 3
54	+ 3	+ 4	+ 7	-	0	- 6
55	+ 6	0	+ 7	-	- 1	- 6
56	+ 5	+14	+26	-	+ 4	+ 6
57	- 2	+ 6	+ 4	-	- 3	-13
58	+ 3	-	-	-	+ 5	-10
59	-	-	-	-	+25	+10
60	+ 1	+ 3	0	-	+ 4	- 9
61	-	- 3	-	-	+ 6	- 2
62	+ 1	+ 4	+ 7	-	-24	-10
63	-	+ 8	+12	-	+ 8	+ 1
64	- 1	+21	+14	-	+ 6	+14
65	0	+17	- 5	-	- 3	+ 9
66	-12	+18	+13	-	- 3	+10
96	+10	+ 5	-11	-	+ 9	- 1
97	+ 4	+ 8	0	-	- 7	+ 9
98	+ 8	+ 1	- 7	-	+ 4	- 6

TABLE AVIII.81

IONIC BALANCE OF SWEAT: FLIGHT 4
(Cations minus Anions; mEq/L)

Subject Code No.	P I	P II	EXP I	EXP II*	REC I	REC II
67	-	+ 5	+ 5	-	+11	+19
68	+ 7	-	-	-	-	-
69	+13	+ 7	+ 2	-	+ 6	+19
70	+ 6	+ 3	+ 7	-	+ 6	+16
71	+ 3	+ 2	0	-	+ 7	+ 7
72	+ 9	+ 2	+18	-	+ 5	+ 2
73	+11	+ 9	+20	-	-	-
74	+10	+ 7	+15	-	+10	+ 4
75	- 6	+ 9	+21	-	+15	+ 8
76	+ 7	+ 7	+22	-	+10	+ 7
77	+20	+17	-	-	-	-
78	+ 4	+ 2	+27	-	+10	0
79	- 7	-	-	-	+28	- 2
80	+ 8	+15	+20	-	+13	+ 5
81	- 9	+ 6	+22	-	+13	+18
82	-	+ 8	+40	-	-	+15
83	+ 5	-	+26	-	+21	+ 3
84	+ 7	+ 1	+15	-	+ 9	+ 9
85	+ 2	+ 1	+11	-	+ 1	+11
86	+12	- 2	+20	-	+ 8	+15
87	+ 6	+ 1	-	-	-	+ 4
88	+ 8	+ 2	-	-	-	-
99	+ 2	+25	+ 2	-	- 3	-
100	- 1	0	- 7	-	- 2	+ 7
101	+ 2	-	-11	-	+ 1	- 3

APPENDIX IX

KETONE BODY METABOLISM IN RELATION
TO SEASON, TEMPERATURE, AND DIET
(Prepared in collaboration with Evelyn M. Robbins and Lauri M. Sawyer)

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A. KETONE BODY METABOLISM IN MAN AT REST

1. Introduction

There is an interesting dichotomy in the scientific study of ketone body metabolism. A voluminous literature exists concerning ketosis in diabetes mellitus, ketosis in farm animals, the effects of ketogenic diets, and the place occupied by acetoacetic acid in intermediary metabolism. Only a meager literature exists on ketone body metabolism in normal human beings during and after exercise, and very few papers exist on the effects of season and temperature. No work has been done on ketone bodies in sweat.

Part of the past difficulty in the systematic study of ketone body metabolism has been the lack of a good method yielding truly quantitative results for beta hydroxybutyric acid. This defect we have now remedied; we have developed a method for serum, urine, and sweat that permits quick analysis of numerous specimens, with excellent recovery of all three ketone bodies.

Using this method we have made a comprehensive study on the mutual interrelations between temperature, season, diet, and physical work as they relate to ketone body metabolism at rest. This report presents the method and its validation; our results; and certain generalizations which are important for interpreting the physiological nutrition of survival rations.

2. Estimation of Acetone, Acetoacetic Acid, and Beta Hydroxybutyric Acid in Serum, Urine, and Sweat

References:

1. Michaels, G. B., Morgan, S., Liebert, G., and Kinsell, L. W.: Studies in fat metabolism; 1. The colorimetric determination of ketone bodies in biological fluids. J. Clin. Invest., 30:1483-1485 (December) 1951.

2. Sargent, F., II, and McArthur, E. M.: A critical review of quantitative methods for determining ketone bodies in biological fluids. WADC TR 53-335, February, 1953.

Principle:

Beta hydroxybutyric acid is oxidized to acetoacetic acid by dichromate in strongly acid solutions at temperatures above 100°C. Metaphosphoric acid catalyzes this reaction so that it goes to completion. Acetoacetic acid is decarboxylated by heat in acid solution to form acetone. Acetone reacts in acid medium with 2, 4-dinitrophenyldydrazine to form acetone 2, 4-dinitrophenylhydrazone. In alkaline medium the hydrazone is extracted into carbon tetrachloride and assayed spectrophotometrically.

Equipment:

1. Cone-tipped centrifuge tubes of 15-ml capacity, each fitted with a clean rubber stopper.

2. An assortment of pipettes, burettes, and calibrated syringe pipettes.

3. An angle-head centrifuge.

4. About two dozen screw-topped, round-bottomed glass tubes, 20 mm OD x 125 mm, fitted with screw-on metal caps and teflon plugs. The cap is a commercial metal dome cap. Snugly fitting penny-head teflon plugs are machined from solid teflon rod, previously autoclaved for five hours to preshrink it. A screw hold is bored half way into this plug from the top, and thus it can be removed easily by means of a screw used as a handle.

5. Bakelite dome caps (screw on) fitted with internal teflon gaskets to fit the tubes described in #4.

6. An offset wheel nut wrench which fits the metal and bakelite caps. Thus, they can be put on snugly and removed easily.

7. An eight-quart pressure cooker.

8. A metal rack to fit inside the pressure cooker and to hold tubes as described in #4.

9. A cold running water bath for cooling tubes.

10. A hot plate or gas stove.

11. A mechanical shaker for the tubes described in #4. Stroke should be about two inches, rate about 150 cycles/min.

12. An aspirator equipped with pressure tubing and a stainless steel 14-gauge needle six inches long. The exit from the aspirator should be extended by rubber tubing going into a sink drain.

13. A Coleman, Jr., spectrophotometer with cuvette holder and a quantity of matched cuvettes with a two-ml capacity.

Reagents:

1. Metaphosphoric acid, HPO_3, 0.092 molar. (Dissolve 0.75 gm anhydrous HPO_3 in 100 ml of water; make up fresh daily.)

2. Sulfuric acid, 3 N. (Add 84 ml of concentrated sulfuric acid to 916 ml of water. (This keeps indefinitely.)

3. Sulfuric acid-dichromate mixture, 3 N in H_2SO_4 and 0.02 molar in potassium dichromate. (In one liter of 3 N sulfuric acid dissolve 4 gm of $K_2Cr_2O_7$. This keeps indefinitely.)

4. Potassium dichromate, $K_2Cr_2O_7$, 0.013 molar. (In one liter of water dissolve 4 gm of $K_2Cr_2O_7$. This keeps indefinitely.)

5. Sodium sulfite, 0.08 molar. (Dissolve one gm anhydrous Na_2SO_3 in 100 ml water. Make up fresh daily.)

6. Carbon tetrachloride, reagent grade.

7. Sodium hydroxide, 0.5 N. (Dissolve 20 gm of NaOH in one liter of water. This keeps indefinitely.)

8. Acid 2, 4-dinitrophenylhydrazine solution, 0.005 molar. (Dissolve 1 gm of reagent in one liter of 2 N hydrochloric acid. This keeps indefinitely but sometimes throws down a slight **precipitate**. Decanting off the clear supernatant is desirable prior to use of the reagent.)

9. Primary standard solutions of acetone, acetoacetic acid, and beta hydroxybutyric acid, each containing 10 mMols/l, acetone equivalent.

(a) Acetone, M.W. 58.08. Use reagent grade, redistilled prior to use, and boiling at 56.5°C. Dissolve 581 mg in one liter of water. It should be assayed iodimetrically to establish its true concentration.

(b) Acetoacetic acid, M.W. 102.1. Use reagent grade ethyl acetoacetate, B.P. 180°C. Redistill prior to use. Dissolve 1.021 gm in one liter of 0.1 N sulfuric acid. Stand 24 hours in the refrigerator, prior to first use, to permit hydrolysis to acetoacetic acid.

(c) Calcium-zinc beta hydroxybutyrate, M.W. 517.5. One mol of $CaZn(C_4H_7O_3)_4$ yields four mols of beta hydroxybutyric acid. In one liter of 0.1 N sulfuric acid dissolve 1.294 gm $CaZn(C_4H_7O_3)_4$. A quantity of calcium-zinc beta-hydroxybutyrate was prepared from pure beta-hydroxybutyric acid according to the method of Shaffer and Marriott (1913-14) and Blumden (1938). The crystals were analyzed for carbon and hydrogen by the Clark Microanalytical Laboratory, Urbana. Previous investigators have reported that the calcium-zinc salt has the formula $CaZn(C_4H_7O_3)_4$ and that the crystals melt at 240°C, the melting point not being sharp. In our hands, the crystals begin to melt at 239°C; melting is complete at 242°C. The chemical results indicate that our compounds agreed closely with theory:

% Composition	Theory	Sample No. 1	Sample No. 2
Carbon	37.11	37.21	36.26
Hydrogen	5.45	5.50	5.34

We have used sample No. 1 in all the experiments to be reported below.

Procedure:

A. Total Acetone Bodies in Serum, Urine, or Sweat

1. In a cone-tipped centrifuge tube place 10.0 ml of 0.092 molar metaphosphoric acid.
2. Add 0.5 ml of serum, urine or sweat. With each run always have a reagent blank of 0.5 ml of water and a standard.
3. Stopper. Mix by inversion. Do not shake because of possible frothing.
4. If a precipitate forms, centrifuge 10 minutes at high speed and save supernatant for analysis. (In the refrigerator this extract is stable for at least 72 hours.)
5. To a screw-topped tube add 3.0 ml of supernatant for specimens expected to be low in ketone bodies. Add 1.0 ml for high specimens.
6. Add 1.0 ml sulfuric acid-dichromate.
7. Place penny-head teflon plug in tube and screw on metal cap firmly with wrench.
8. Autoclave in rack one hour at 15 pounds.
9. Remove rack to cold water bath for 5 minutes.
10. If any specimens have turned green, i.e. have reduced all dichromate (as sometimes happens with undiluted urine), discard and run again with 1.0 ml metaphosphoric acid extract plus 2 ml metaphosphoric acid. Correct final answer by a factor of 3.
11. Remove caps with wrench, and then plugs. Add, in order, mixing between additions:

    a. 1.0 ml of Na_2SO_3

b. 2.0 ml of 2, 4-dinitrophenylhydrazine

c. 4.0 ml of carbon tetrachloride

12. Place bakelite caps firmly on tubes. Place horizontally in shaker and shake for 10 minutes.

13. Remove tubes to rack; remove caps and aspirate off supernatant.

14. Fill tubes to rack with water, but do not shake. Aspirate off supernatant.

15. Add 3.0 ml 0.5 of NaOH. Shake three minutes. Aspirate off water layer.

16. Transfer carbon tetrachloride layer to 2-ml cuvette and read at 420 millimicrons.

17. Calculate concentration from standard curve made from standards in range 0 to 5 mMols/l.

B. Acetone in Serum, Urine, or Sweat

1. Carry out steps A 1, A 2, A 3, A 4, and A 5.
2. Add 1.0 ml of 3 N sulfuric acid (no dichromate).
3. Add 2.0 ml of 2, 4-dinitrophenylhydrazine.
4. Add 4.0 ml of carbon tetrachloride.
5. Carry out steps A 12, A 13, A 14, A 15, A 16, A 17.

C. Acetoacetate in Serum, Urine, or Sweat

1. Carry out steps A 1, A 2, A 3, A 4, and A 5.
2. Add 1.0 ml of 3 N sulfuric acid (no dichromate).
3. Carry out steps A 7 and A 8.
4. Autoclave 20 minutes at 15 pounds.
5. Carry out step A 9.
6. Add 2.0 ml of 2, 4-dinitrophenylhydrazine.
7. Add 4.0 ml of carbon tetrachloride.
8. Carry out steps A 12, A 13, A 14, A 15, A 16, and A 17.
9. Step A 17 gives the sum of acetone and acetoacetate.
10. To obtain true acetoacetate, subtract the value for acetone (Step B 5) from the value for acetone plus acetoacetate (Step C 9).

D. Beta Hydroxybutyrate in Serum, Urine, or Sweat

1. Carry out steps A 1 through A 17. This gives the sum of acetone plus acetoacetate plus beta hydroxybutyrate.

2. Subtract the value for acetone plus acetoacetate (step C 9) from the value for total acetone bodies (step A 17). The result is true beta hydroxybutyrate.

Precautions:

1. Carbon tetrachloride vapors can be dangerous when inhaled. Every precaution should be taken to insure adequate ventilation at all stages.

2. Complete closure during autoclaving is essential to prevent loss of acetone. Teflon plugs must be snug. Caps must be screwed on tight. Leakage will be detected when acetone standards not autoclaved are higher than acetone standards autoclaved.

3. The extraction ratio of acetone 2, 4-dinitrophenylhydrazone between carbon tetrachloride and aqueous layers is affected by temperature, pH, and rate of shaking. Therefore, a blank and standard must be run with each batch of specimens, and they should all be shaken at the same time in the same shaker.

4. Rapid shaking is essential. An emulsion must be formed during step A 12, which should break on standing. If it does not, centrifuging at slow speed will almost always break it.

3. Validation of Method for Estimating Acetone, Acetoacetate, and Beta Hydroxybutyrate in Serum, Urine, and Sweat

We have improved over previous methods by establishing conditions under which one mol of beta hydroxybutyrate will yield one mol of acetone. Most previous workers have had to content themselves with about 70% recovery (Sargent and McArthur, 1953). We have found that metaphosphoric acid catalyzes the oxidation of beta hydroxybutyrate so that the reaction goes to completion without loss. In this section we shall discuss those features of the method which have proved essential for reproducibility and specificity: closure; optimal concentration of reagents; optimal times for autoclaving; the problem of deproteinization. Evidence of reliable recovery is presented for added acetone, actoacetate, and beta hydroxybutyrate.

An almost universal error by previous workers in this field who have used colorimetric methods has been in their failure to express recovery of beta hydroxybutyrate in terms of the acetone equivalent. They have used aqueous standards of beta hydroxybutyrate, have added beta hydroxybutyrate to serum or urine, and then have assumed they were getting good recovery. All studies of recovery must be based on acetone standards as the absolute measure, which has been the practice of those using gravimetric or titrimetric methods. In other words, one must avoid a "built-in" correction factor. The best previous recoveries have been 80% of true theoretical.

Closure. Acetone must not volatilize during heating. Therefore, we have devised an adequate system of closure. The neck of the tube is closed first with a teflon plug, machined as a penny-head plug. The plug position has the dimensions, O.D., 12 mm; length, 17 mm. The penny-head top is integral with the plug, but has the dimensions O.D., 17 mm; thickness, 2 mm. A screw hole is tapped centrally to facilitate extraction of the plug by means of a screw used as a handle. The metal dome cap which goes over the neck of the tube after the teflon plug has been inserted has the dimensions: O.D., 18 mm; height, 8 mm. It has a 2-mm flange around the base.

With this closure acetone standards up to 10 mMol/L can be autoclaved one hour at 15-lb. pressure with recovery of 98±2 per cent consistently. The plug contributes no blank whatever.

Optimal Concentrations of Reagents. When we discovered that metaphosphoric acid catalyzes the oxidation of beta hydroxybutyrate to acetoacetate and then acetone, it became necessary to establish the optimal concentration of all reagents in the presence of metaphosphoric acid, as well as the optimal concentration of metaphosphoric acid.

TABLE AIX.1

OXIDATION OF BETA HYDROXYBUTYRIC ACID
IN RELATION TO CONCENTRATION OF METAPHOSPHORIC ACID
(Each tube when autoclaved contained 3 ml HPO_3; 0.2 ml H_2O; 1/2 ml beta hydroxybutyrate, 0.258 mMols/L or 1/2 ml water; and 1/2 ml sweat or 1/2 ml water. Immediately prior to closure, 1 ml of acid-dichromate was added to each tube. Autoclaving was one hour at 15-pounds pressure.)

Final Molarity of HPO_3 in Extract	ml Sweat	ml BOH*	Optical Density
	A. Beta Hydroxybutyrate in Water		
0.00	0	0.5	0.042
0.09	0	0.5	0.048
0.18	0	0.5	0.036
0.27	0	0.5	0.033
0.36	0	0.5	0.030
	B. Beta Hydroxybutyrate plus Sweat		
0.00	0.5	0.5	0.040
0.09	0.5	0.5	0.123
0.18	0.5	0.5	0.115
0.27	0.5	0.5	0.099
0.36	0.5	0.5	0.092
	C. Total Ketone Bodies in Sweat		
0.00	0.5	0.0	0.046
0.09	0.5	0.0	0.072
0.18	0.5	0.0	0.071
0.27	0.5	0.0	0.052
0.36	0.5	0.0	0.043
	D. Recovery of Added Beta Hydroxybutyrate (OD in B minus OD in C)		
0.00	0.5	0.5	0.000
0.09	0.5	0.5	0.051
0.18	0.5	0.5	0.044
0.27	0.5	0.5	0.047
0.36	0.5	0.5	0.049

* BOH = beta hydroxybutyrate

Using aqueous standards as well as urine, Sargent and McArthur (1951) had established the optimal final concentration for sulfuric acid, dichromate, and 2, 4-dinitrophenylhydrazine. We have confirmed their conclusions. They also established optimal volumes and conditions of shaking to extract the hydrazone. We have adopted their recommendations. Our present study of optimal concentrations concerned metaphosphoric acid, as well as the optimal concentration of metaphosphoric acid and sulfite. Sargent and West (unpublished observations, 1954) had concluded tentatively that 0.15 molar HPO_3 yielded good results, but their work was never completely validated.

We have established that reproducibility of duplicates as well as consistency of recovery are best at a final concentration of 0.09 molar HPO_3 for the extract of serum, urine, or sweat. A typical experiment in which all factors were kept constant, except the final concentration of HPO_3, is shown in Table AIX.1. Clearly a final extract concentration of 0.09 molar HPO_3 is optimal for its catalytic effect.

After oxidation with dichromate, enough sulfite must be added to reduce all remaining dichromate to chromite, which is innocuous for the rest of the procedure. Excess sulfite causes erratic results, and we have established that a final concentration of 0.013 molar with respect of Na_2SO_3 is optimal. Table AIX.2 is an experiment which demonstrates this phenomenon for acetone and for beta hydroxybutyrate.

TABLE AIX.2

EFFECT OF VARIATION IN FINAL CONCENTRATION OF SODIUM SULFITE ON ESTIMATION OF KETONE BODIES

(To each tube were added 3 ml HPO_3 1/2 ml acetone or beta hydroxybutyrate standard, and 0.7 ml water. Prior to autoclaving, 1 ml acid dichromate was added. Autoclaving was one hour at 15 pounds. After cooling, 1 ml sodium sulfite solution was added to each tube.)

Final Molarity of Na_2SO_3	ml Acetone	ml* BOH	Optical Density
	A. Acetone		
0.000	0.5	0.0	0.000
0.006	0.5	0.0	0.040
0.013	0.5	0.0	0.059
0.026	0.5	0.0	0.055
0.052	0.5	0.0	0.050
	B. Beta Hydroxybutyrate		
0.000	0.0	0.5	0.000
0.006	0.0	0.5	0.480
0.013	0.0	0.5	0.560
0.026	0.0	0.5	0.510
0.052	0.0	0.5	0.055

* BOH = beta hydroxybutyrate

Optimal Times for Autoclaving. With our instrumentation and conditions, we find that acetoacetate is decarboxylated quantitatively after 20 minutes at 15-lb pressure. Previous workers (Michaels et al., 1951) have recommended 10 minutes and 30 minutes for these two reactions. To test this point, which is crucial for consistent results, we devised a series of experiments in which standards of acetone, acetoacetate, or beta hydroxybutyrate were added to 0.09 molar HPO_3, appropriate reagents were added for various periods of time. Acetone was used for absolute comparison, treated either like acetoacetate of like beta hydroxybutyrate. Results are shown in Table AIX.3.

TABLE AIX.3

AUTOCLAVING TIME FOR QUANTITATIVE ESTIMATION OF KETONE BODIES
(Aqueous Solutions)

Material Autoclaved	Optical Density After Autoclaving				
	10 min	20 min	30 min	45 min	60 min
Reagent Blank	0.000	0.000	0.000	0.000	0.000
0.387 mMol/L					
Acetone #1	0.027	0.025	0.027	-----	-----
Acetoacetate	0.032	0.027	0.027	-----	-----
Beta hydroxybutyrate	-----	-----	0.022	0.022	0.027
Acetone #2	-----	-----	0.023	0.025	0.022
1.546 mMol/L					
Acetone #1	0.091	0.090	0.089	-----	-----
Acetoacetate	0.105	0.111	0.111	-----	-----
Beta hydroxybutyrate	-----	-----	0.080	0.090	0.099
Acetone #2	-----	-----	0.090	0.090	0.089

Another aspect of autoclaving time had to be investigated: What happens **when samples of serum,** urine, and sweat **are naturally** high because of a ketogenic regimen? Can acetoacetate be decarboxylated quantitatively in the presence of dichromate? Previous work with aqueous solutions has indicated about a 30 - 60% loss of acetoacetate when dichromate is present from the beginning of autoclaving (Sargent and McArthur, 1953). A single experiment was designed to answer this question for serum and urine, obtained from a subject who starved 36 hours and was in strong ketosis. Aqueous standards of beta hydroxybutyrate were used as a check on absolute recovery. In one series of extracts, the specimens were autoclaved with acid for 20 minutes first, dichromate was added, and autoclaving was continued for 60 minutes. In the other series, acid-dichromate was added at the start and autoclaving was for 60 and 80 minutes, respectively. We conclude (Table AIX.4) that acetoacetate in natural ketosis is not appreciably damaged by the presence of dichromate. However, there is a suggestion that some other substance in urine is destroyed slowly, bringing the ultimate value down to "true total ketone bodies" when oxidation of beta hydroxybutyrate has been completed. This phenomenon was not present for aqueous solutions or in serum. We have settled on 60 minutes autoclaving in the presence of acid-dichromate as satisfactory.

TABLE AIX.4

EFFECTS ON TOTAL KETONE BODIES OF VARIATION
IN ADDITION OF ACID AND DICHROMATE AND TIME OF AUTOCLAVING

Material Analyzed		Optical Density After Treatment A*	B**	C***
Aqueous Beta Hydroxybutyrate	a)	0.100	0.100	0.104
	b)	0.141	0.130	0.140
Serum from Starving Subject		0.518	0.488	0.516
Urine from Starving Subject		0.331	0.320	0.312

A* Acid added first, followed by 20 minutes autoclaving. Dichromate then added, followed by 60 minutes autoclaving.

B** Acid-dichromate added first, followed by 60 minutes autoclaving.

C*** Acid-dichromate added first, followed by 80 minutes autoclaving.

The Problem of Deproteinizing Serum. A considerable study of various agents for deproteinizing serum was made by Sargent and McArthur (1953) and by Shapiro (1955). Their observations were on barium hydroxide, zinc sulfate, and cadmium sulfate as they affected recovery of acetoacetate. At the time of their work the closure problem had not yet been solved, and they were troubled by erratic, occasionally low, recoveries. Furthermore, they experienced with serum very troublesome emulsions during and after shaking with carbon tetrachloride. It would be desirable to make a systematic comparative study of deproteinizing agents using our current method of closure, and including studies of beta hydroxybutyrate in addition to acetone and acetoacetate. However, pressure of other work has prevented us from completing this phase of acetone methodology.

We have completed the study on metaphosphoric acid as protein precipitant, as initiated in 1954 by Sargent and West. At final concentration of 0.09 molar, it is eminently satisfactory as a protein precipitant in the proportion 10 ml of metaphosphoric acid plus 0.5 ml of serum. Precipitation is clean, and no emulsions form at any stage of the estimation of beta hydroxybutyrate. Furthermore, it catalyzes the oxidation of beta hydroxybutyrate so that formation of acetone is quantitative. A validation study was planned in which acetone, acetoacetate or beta hydroxybutyrate was added to normal serum, and triplicate runs were made by the appropriate method for the respective compound. Recovery was consistently good (Table AIX.5), and checks were reproducible. The values for acetoacetate and beta hydroxybutyrate were somewhat high. If they were corrected for precipitate volume, 0.25 in 10.5, they would be perfect. However, for routine use this

correction is not justifiable without a detailed study of acid binding by the protein precipitate.

TABLE AIX.5

METAPHOSPHORIC ACID AS PROTEIN PRECIPITANT:
RECOVERY OF ACETONE, ACETOACETATE, OR BETA HYDROXYBUTYRATE ADDED TO SERUM
(Triplicate estimations on normal serum to which the compound was added.)

Compound Added and Concentration in Serum	Recovery, % 1	2	3
Acetone, 0.703 mMol/L	100.0	96.5	98.2
Acetoacetate, 0.703 mMol/L	107.5	104.5	104.5
Beta hydroxybutyrate, 0.703 mMol/L	104.5	103.0	101.5

Reproducibility and Reliability. When acetone, acetoacetate or beta hydroxybutyrate are added to serum, urine, or sweat, we expect to recover 100% of theory, with variations of -3% to +7%. Table AIX.6 summarizes such data for serum and urine.

TABLE AIX.6

RECOVERY OF ACETONE, ACETOACETATE, AND BETA HYDROXYBUTYRATE ADDED TO SERUM AND URINE

Tube Contents	Optical Density (Average of duplicates)	Recovery % of theory
	A. Serum	
Acetone + water	0.057	
Serum	0.004	98.2
Acetone + serum	0.060	
Acetoacetate + water	0.067	
Serum	0.012	106.0
Acetoacetate + serum	0.083	
Beta hydroxybutyrate + water	0.099	
Serum	0.052	98.0
Beta hydroxybutyrate + serum	0.149	
	B. Urine	
Acetone + water	0.072	
Urine	0.002	97.2
Acetone + urine	0.072	

TABLE AIX.6 (Contd)

Tube Contents	Optical Density (Average of duplicates)	Recovery % of theory
Acetoacetate + water	0.104	
Urine	0.022	100.0
Acetoacetate + urine	0.126	
Beta hydroxybutyrate + water	0.092	
Urine	0.021	99.0
Beta hydroxybutyrate + urine	0.112	

The standard curve for beta hydroxybutyrate is reproducible from day to day. On twelve successive working days, standard points were run routinely to a total of 20. The mean optical density was 0.144; s.d., ±0.002.

A sample of urine collected from a starving subject, and naturally high in ketone bodies, was run repetitively for total ketone bodies on successive days. Optical densities for five successive days were 0.943, 0.950, 0.950, 0.950, and 0.950.

This method is highly reproducible and reliable.

4. Data on Ketone Body Metabolism

Summer (1955) and Winter (1954). Ketosis may be defined as an abnormal increase in the urinary rate of excretion of acetone, acetoacetate, and beta hydroxybutyrate, together with an abnormal increase in serum concentrations of these three compounds. It may be related to an abnormally large production of ketone bodies, or to a change in kidney function, leading to retention. We dealt with three ketogenic regimens -- ST 0, 2/20/78, and 30/0/70. Two were antiketogenic -- 0/100/0 and 15/52/33. It is the purpose of most of the remainder of this report to elucidate the factors that affect the ketogenicity of a regimen, and, as a basis for further discussion, we shall present without much comment at this point the combined "resting" data for the summer study of 1955 and the winter study of 1954 on urinary excretion, serum concentration, urine/serum concentration ratio, and renal clearance.

Pre-period data on urinary excretion are to be found in Table AIX.7A for summer. There were no significant differences between groups, because of a high coefficient of variation. Data for the experimental periods are in Table AIX.8. The ketogenic regimens were ST 0, 2/20/78, and 30/0/70. Similar data from which similar conclusions may be drawn are found for the winter study in Tables AIX.7B and AIX.9.

Data on serum concentrations will be found in Table AIX.10 for pre-periods. Within summer and winter groups there were no significant differences. Experimental periods for summer are in Table AIX.11 and for winter in Table AIX.12. Highest values are found in ST 0, 2/20/78, and 30/0/70.

The pre-period values for urine/serum ratios of total ketone bodies are given in Table AIX.13. Within the groups -- both summer and winter -- there were no significant differences. Experimental period values are given in Table AIX.14 for the summer and in Table AIX.15 for the winter. Maximal values are associated with the ketogenic diets ST 0, 2/20/78, and 30/0/70.

Pre-period data on renal clearance of total ketone bodies are found in Table AIX.16 calculated from the standard clearance formula (urine concentration) x (minute urine volume)/(serum concentration). Within summer and winter groups there were no significant differences. Data for experimental periods are in Table AIX.17 for summer and Table AIX.18 for winter. No strikingly high values are to be found. In fact, these data are almost conclusive that ketone bodies are actively reabsorbed in the kidney, like sodium and chloride, whose renal clearances are very similar to those reported here.

TABLE AIX.7

PRE-PERIOD DATA ON URINARY EXCRETION OF TOTAL KETONE BODIES
(micromols/min; resting; PRE II)

Flight	N	Mean	s.d.	C.V.	Temperature, °F
		A. Summer Study, 1955			
1	21	0.64	0.15	23	79
2	22	0.83	0.42	50	79
3	21	0.88	0.16	18	80
4	22	0.79	0.57	72	80
FRA	11	1.08	0.85	79	--
		B. Winter Study, 1954			
1	22	2.37	1.74	73	38
2	22	3.00	0.94	31	38
3	22	2.40	1.29	54	20
4	21	2.45	1.17	48	20
FRA	12	3.10	1.32	43	--

C. Statistical Evaluation

Summer: No group differences significant at 5% level.

Winter: No group differences significant at 5% level.

TABLE AIX.8

TOTAL KETONE BODIES--RESTING URINE--THREE-HOUR TEST--SUMMER 1955
(micromol/min)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
ST 0	U	0.56	2.78	4.84	0.81	15.74	2.51
	L	0.91	2.78	3.40	0.58	28.88	11.32
0/100/0	U	0.82	0.27	1.92	0.75	0.68	0.52
1000	L	0.78	0.82	0.85	0.57	1.37	0.48
0/100/0	U	0.71	0.34	1.19	0.77	0.71	0.62
2000	L	0.60	0.48	0.72	1.66	0.84	0.16
2/20/78	U	0.64	3.95	4.18	0.95	4.43	1.06
1000	L	1.29	2.13	0.98	0.40	16.37	5.30
2/20/78	U	0.60	2.72	2.75	1.67	3.41	1.48
2000	L	0.67	1.12	0.79	1.26	5.91	0.75
15/52/33	U	1.86	1.73	2.90	0.80	0.70	0.78
1000	L	1.10	0.80	----	0.58	1.52	1.48
15/52/33	U	0.57	0.49	1.48	0.87	1.66	2.04
2000	L	0.86	1.65	0.77	0.84	0.60	0.54
15/52/33	U	0.56	0.69	1.62	1.24	0.72	0.92
3000	L	0.62	0.70	0.62	0.78	----	----
30/0/70	U	0.68	4.88	10.09	0.79	6.17	2.15
1000	L	0.90	1.58	3.87	0.94	14.78	4.03
30/0/70	U	0.70	4.76	6.90	0.92	2.36	1.31
2000	L	0.51	1.16	2.88	0.49	1.39	0.58
FRA	U	0.66	0.64	0.89	0.87	0.77	0.89
	L	2.52	0.66	0.98	0.75	0.95	0.89

TABLE AIX.9

TOTAL KETONE BODIES--RESTING URINE--TWO-HOUR TEST--WINTER 1954
(micromol/min)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
ST 0	U	1.81	19.32	1.37	2.19	44.89	6.74
	L	4.14	12.14	5.56	1.80	34.45	10.08
0/100/0	U	1.82	3.04	0.55	1.30	3.32	1.26
1000	L	4.78	3.20	2.72	1.64	2.89	1.19
0/100/0	U	1.08	1.92	1.02	1.72	2.74	1.90
2000	L	1.80	0.73	0.62	3.40	1.95	2.24
2/20/78	U	2.90	18.08	5.95	2.64	25.24	22.30
1000	L	3.06	6.21	1.77	2.24	21.72	15.34
2/20/78	U	1.72	8.43	6.22	3.59	13.31	31.28
2000	L	2.55	8.35	3.39	2.81	5.32	5.06

TABLE AIX.9 (Contd)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
15/52/33	U	1.42	3.38	1.63	1.40	3.26	1.94
1000	L	1.44	3.36	1.82	2.62	2.78	3.31
15/52/33	U	1.46	4.38	3.09	3.14	6.02	3.01
2000	L	2.78	4.47	1.68	2.14	4.10	2.21
15/52/33	U	1.62	2.89	2.64	4.11	3.78	2.78
3000	L	2.01	4.62	2.64	4.96	3.03	2.60
30/0/70	U	5.14	52.44	15.59	1.88	21.87	21.80
1000	L	3.47	15.71	6.02	1.50	6.29	3.62
30/0/70	U	5.30	32.24	9.82	1.54	13.23	6.92
2000	L	2.85	10.85	3.83	1.74	8.39	5.28
FRA	U	2.62	2.88	2.69	3.11	2.85	4.20
	L	2.87	3.66	3.00	3.82	3.04	2.55

TABLE AIX.10

PRE-PERIOD DATA ON TOTAL KETONE BODIES: SERUM
(mMol/L; Summer, 1955, and Winter, 1954; at rest; PRE II.)

Flight	N	Mean	Range	s.d.	C.V.	Temp., °F
			A. Summer 1955			
1	22	0.50	0.26 - 0.84	0.15	30	79
2	22	0.62	0.42 - 1.03	0.14	23	79
3	22	0.70	0.40 - 1.37	0.23	33	80
4	22	0.75	0.45 - 1.10	0.20	27	80
FRA	11	0.68	0.50 - 1.01	0.17	24	--
			B. Winter 1954			
1	22	0.87	0.44 - 1.54	0.30	34	38*
2	22	0.58	0.25 - 0.93	0.17	29	38*
3	22	0.63	0.30 - 1.04	0.19	30	20*
4	21	0.93	0.68 - 1.56	0.10	11	20*
FRA	12	0.96	0.54 - 1.56	0.38	39	--

C. Statistical Evaluation

Summer: No group differences significant at 5% level.

Winter: No group differences significant at 5% level.

* The subjects lived in warm barracks and were not exposed to the weather more than two hours each day in pre-periods.

TABLE AIX.11

TOTAL KETONE BODIES: SERUM, SUMMER 1955
(mMol/L; Resting)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
ST 0	U	0.36	1.65	1.56	0.54	1.87	4.27
	L	0.69	4.22	1.88	0.67	2.49	5.02
0/100/0	U	0.54	0.54	0.52	0.54	0.92	0.70
1000	L	0.50	0.73	0.36	1.02	0.32	0.60
0/100/0	U	0.56	0.42	0.52	0.58	0.65	0.43
2000	L	0.78	0.42	0.49	0.88	0.25	0.42
2/20/78	U	0.44	0.75	2.58	1.08	1.14	1.23
1000	L	0.55	2.32	0.69	0.80	0.99	2.08
2/20/78	U	0.61	0.60	0.84	0.68	0.81	0.51
2000	L	0.69	2.19	0.60	0.71	0.66	0.63
15/52/33	U	0.64	0.67	0.67	0.66	0.70	0.67
1000	L	0.48	0.82	ND	0.52	0.69	0.66
15/52/33	U	0.63	0.38	0.67	1.00	0.58	0.54
2000	L	0.64	0.67	0.66	0.94	0.67	0.76
15/52/33	U	0.40	0.54	0.73	0.74	0.44	0.63
3000	L	0.50	0.44	0.46	0.49	ND	ND
30/0/70	U	0.54	0.93	2.64	0.82	2.46	1.50
1000	L	0.72	3.24	0.90	0.90	1.42	0.96
30/0/70	U	0.40	0.84	1.96	0.66	0.70	0.63
2000	L	0.61	1.86	1.10	0.62	0.48	0.81
FRA	U	0.67	0.46	0.68	0.68	0.58	0.66
	L	0.70	0.69	0.72	0.69	0.63	0.91

TABLE AIX.12

TOTAL KETONE BODIES: SERUM, WINTER 1954
(mMol/L; Resting)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
ST 0	U	0.92	4.71	4.23	0.60	4.84	4.30
	L	0.46	3.99	2.54	0.78	4.60	1.76
0/100/0	U	0.73	1.56	0.74	0.44	0.84	0.68
1000	L	0.70	1.47	0.83	1.12	0.94	0.92
0/100/0	U	0.63	0.80	0.54	0.72	0.62	0.52
2000	L	0.51	1.00	0.54	1.00	0.50	0.50
2/20/78	U	0.94	3.21	3.04	0.69	3.99	3.27
1000	L	0.58	2.74	1.66	0.78	4.10	3.86
2/20/78	U	0.66	2.67	1.74	0.68	2.05	1.76
2000	L	0.65	1.88	1.64	0.78	1.77	1.16

TABLE AIX.12 (Contd)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
15/52/33	U	0.65	1.24	1.13	0.58	1.20	0.58
1000	L	0.40	1.23	0.78	0.99	1.16	1.40
15/52/33	U	0.84	1.25	1.06	0.40	1.13	0.96
2000	L	0.60	1.06	0.66	1.12	0.90	0.72
15/52/33	U	0.96	1.13	1.57	0.74	0.92	0.61
3000	L	0.61	0.56	0.52	0.95	0.61	0.56
30/0/70	U	1.32	6.62	5.22	0.76	3.72	4.64
1000	L	0.66	3.45	2.70	0.96	2.46	2.26
30/0/70	U	0.96	3.74	3.63	0.68	2.60	2.46
2000	L	0.81	3.04	1.84	0.92	2.44	1.89
FRA	U	0.62	0.74	0.64	1.16	0.83	0.62
	L	0.65	0.65	0.63	1.43	1.22	0.92

TABLE AIX.13

PRE-PERIOD DATA ON URINE/SERUM RATIOS FOR TOTAL KETONE BODIES
(Urine Concentration/Serum Concentration; Resting;
Summer, 1955, and Winter, 1954; PRE II)

Flight	N	Mean	Range	s.d.	C.V.	Temp., °F
			A. Summer, 1955			
1	22	1.25	0.20 - 5.27	1.22	99	79
2	22	1.96	0.62 - 4.20	0.89	46	79
3	22	1.38	0.30 - 3.74	0.83	44	80
4	22	1.62	0.49 - 3.45	0.56	34	80
FRA	11	1.37	0.25 - 3.52	0.98	72	--
			B. Winter 1954			
1	22	2.41	0.86 - 6.24	1.49	62	38*
2	22	4.72	1.75 -11.28	2.87	61	38*
3	22	2.28	0.59 - 6.37	1.39	61	20*
4	21	2.82	0.78 - 9.99	2.03	72	20*
FRA	12	3.47	0.61 - 7.80	2.31	66	--

C. Statistical Evaluation

Summer: No group differences significant at 5% level.

Winter: No group differences significant at 5% level.

* In winter, the subjects lived in warm barracks and were not exposed to the weather more than two hours each day in pre-periods.

TABLE AIX.14

TOTAL KETONE BODIES: URINE/SERUM RATIOS, SUMMER 1955
(Urine Concentration/Serum Concentration; Resting)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
ST 0	U	2.42	6.38	13.46	1.22	16.81	1.59
	L	1.89	1.60	3.69	1.38	22.58	4.94
0/100/0	U	0.72	1.71	8.98	1.91	1.01	1.30
1000	L	2.28	4.02	7.55	0.96	13.39	1.78
0/100/0	U	0.80	1.32	4.94	1.50	1.96	4.74
2000	L	1.38	4.52	6.29	2.08	4.84	0.45
2/20/78	U	1.21	16.59	1.13	1.07	2.53	1.37
1000	L	2.93	2.78	1.61	0.57	32.66	2.47
2/20/78	U	0.66	5.76	2.07	2.26	2.74	3.28
2000	L	1.53	0.97	4.36	1.84	17.45	0.95
15/52/33	U	2.30	2.81	6.13	1.12	3.05	2.08
1000	L	3.14	2.30	ND	1.45	5.98	5.18
15/52/33	U	0.34	1.68	2.24	0.42	3.15	1.94
2000	L	1.94	4.40	1.77	2.18	2.14	2.22
15/52/33	U	0.76	1.08	1.00	2.29	2.36	2.39
3000	L	1.94	3.10	1.52	2.06	ND	ND
30/0/70	U	1.31	9.86	6.06	1.33	5.33	4.34
1000	L	1.04	0.98	5.73	2.12	14.92	7.69
30/0/70	U	0.66	4.12	2.19	0.92	4.46	3.52
2000	L	1.54	1.18	4.50	1.84	5.31	1.33
FRA	U	0.64	1.09	0.74	1.44	0.74	1.13
	L	1.50	0.77	0.53	1.94	1.16	0.62

TABLE AIX.15

TOTAL KETONE BODIES: URINE/SERUM RATIOS, WINTER 1954
(Urine Concentration/Serum Concentration; Resting)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
ST 0	U	1.44	5.38	1.75	3.63	11.77	1.05
	L	6.04	7.18	5.56	2.82	10.27	9.82
0/100/0	U	1.90	5.69	2.62	2.12	9.76	2.00
1000	L	2.54	6.39	10.01	2.10	9.66	9.00
0/100/0	U	1.82	6.04	6.48	2.30	8.14	6.58
2000	L	4.32	5.96	3.86	2.40	17.49	12.29
2/20/78	U	2.66	3.66	2.90	1.73	7.42	4.72
1000	L	4.75	6.98	3.92	3.70	13.07	6.96
2/20/78	U	2.14	4.56	1.46	1.67	5.79	1.54
2000	L	5.10	7.66	3.48	2.12	6.20	8.04

TABLE AIX.15 (Contd)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
15/52/33	U	4.08	8.20	3.21	1.22	3.30	3.12
1000	L	3.44	5.97	5.36	2.63	7.72	3.93
15/52/33	U	1.64	1.98	1.16	4.12	6.72	2.34
2000	L	2.46	5.66	3.72	2.42	8.38	5.87
15/52/33	U	1.36	0.66	1.14	1.96	5.66	5.46
3000	L	5.71	9.04	7.19	5.84	6.53	7.91
30/0/70	U	2.78	3.66	1.34	2.59	4.84	4.70
1000	L	6.28	6.28	3.11	2.84	4.62	2.90
30/0/70	U	5.23	4.50	3.03	1.12	1.82	1.77
2000	L	5.31	4.64	2.27	1.35	3.25	2.95
FRA	U	3.88	4.67	5.16	3.76	5.35	2.64
	L	4.08	3.68	2.86	2.15	3.21	0.78

TABLE AIX.16

PRE-PERIOD DATA ON RENAL CLEARANCE OF TOTAL KETONE BODIES
(ml plasma/min.; Summer, 1955, and Winter, 1954, at rest; PRE II)

Flight	N	Mean	Range	s.d.	C.V.	Temp. °F
			A. Summer, 1955			
1	22	1.55	0.75 - 4.62	0.81	52	79
2	22	1.41	0.66 - 4.33	0.92	65	79
3	22	1.46	0.77 - 3.38	0.92	63	80
4	22	1.12	0.39 - 2.43	0.65	58	80
FRA	10	1.24	0.59 - 2.28	0.51	41	--
			B. Winter, 1954			
1	22	2.69	0.99 - 6.27	1.39	52	38*
2	22	5.89	1.78 -24.52	4.66	79	38*
3	22	4.01	1.43 - 9.93	2.16	54	20*
4	21	2.78	0.81 - 7.99	1.60	58	20*
FRA	12	3.45	1.36 - 5.26	1.28	37	--

C. Statistical Evaluation

Summer: No group differences were significant at the 5% level.

Winter: No group differences were significant at the 5% level. P for Flight 1 vs Flight 2 was 0.08.

* In winter the subjects lived in warm barracks and were not exposed to outdoor weather more than two hours daily.

TABLE AIX.17

TOTAL KETONE BODIES: RENAL CLEARANCE, SUMMER 1955
(ml plasma/min; Resting)

Experimental Regimen		Hard Work			Light Work		
		PRE	EXP		PRE	EXP	
		II	I	II	II	I	II
ST 0	U	1.65	1.73	2.78	1.55	7.98	0.83
	L	1.32	0.67	1.95	0.94	9.96	2.26
0/100/0	U	1.53	0.50	3.69	1.42	0.72	0.70
1000	L	1.54	1.12	2.27	0.56	4.15	0.83
0/100/0	U	1.32	0.84	2.30	1.38	0.64	1.65
2000	L	0.77	1.18	1.71	1.66	3.26	0.38
2/20/78	U	1.60	5.00	1.62	0.93	3.89	0.86
1000	L	2.65	0.90	1.50	0.50	22.46	2.44
2/20/78	U	1.12	4.58	3.27	2.44	5.23	2.83
2000	L	0.98	0.52	1.35	1.74	7.66	1.19
15/52/33	U	2.89	2.58	4.34	1.34	0.95	1.20
1000	L	2.26	0.98	ND	1.15	2.26	2.24
15/52/33	U	0.90	1.28	2.21	0.86	2.94	3.69
2000	L	1.32	2.46	1.17	0.92	0.98	0.84
15/52/33	U	1.39	1.62	2.22	1.82	1.66	1.43
3000	L	1.24	1.55	1.37	1.98	ND	ND
30/0/70	U	1.28	5.34	5.14	0.96	2.51	1.43
1000	L	1.26	0.49	4.30	1.11	10.24	4.50
30/0/70	U	1.74	5.21	3.04	1.46	3.34	2.00
2000	L	0.80	0.63	3.20	0.84	2.90	0.72
FRA	U	1.04	1.46	1.50	1.36	1.31	1.36
	L	1.62	0.99	1.36	1.21	1.57	0.98

TABLE AIX.18

TOTAL KETONE BODIES: RENAL CLEARANCE, WINTER 1954
(ml plasma/min; Resting)

Experimental Regimen		Hard Work			Light Work		
		PRE	EXP		PRE	EXP	
		II	I	II	II	I	II
ST 0	U	2.14	3.47	0.92	3.74	8.23	1.56
	L	11.56	2.95	2.29	3.50	5.54	5.37
0/100/0	U	2.46	1.96	0.75	2.98	3.86	1.64
1000	L	6.94	2.24	3.32	1.48	3.01	2.35
0/100/0	U	1.75	2.60	2.24	2.22	4.41	3.79
2000	L	3.68	0.74	1.13	3.44	4.20	4.47
2/20/78	U	3.24	5.20	1.90	3.66	6.48	7.12
1000	L	5.22	2.18	1.37	2.86	6.11	4.22
2/20/78	U	2.59	3.31	3.29	5.94	7.49	3.04
2000	L	5.22	4.65	2.59	3.85	2.98	4.53

TABLE AIX.18 (Contd)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Hard Work EXP II	Light Work PRE II	Light Work EXP I	Light Work EXP II
15/52/33	U	2.52	2.71	1.46	2.42	2.68	5.01
1000	L	3.52	2.87	2.40	2.62	2.35	2.32
15/52/33	U	1.83	3.52	2.91	8.33	5.32	3.32
2000	L	4.62	4.71	2.60	2.17	5.30	2.98
15/52/33	U	1.68	2.56	2.32	5.02	4.24	4.57
3000	L	3.63	8.17	4.98	5.84	5.03	5.30
30/0/70	U	4.13	6.86	2.85	2.54	5.84	4.68
1000	L	5.08	5.02	2.38	1.54	2.56	1.59
30/0/70	U	5.14	7.70	2.46	2.48	5.05	2.86
2000	L	3.57	3.59	2.07	1.89	3.36	2.82
FRA	U	4.26	3.84	4.37	2.53.	3.76	6.89
	L	4.36	4.62	5.29	2.64	3.06	2.80

5. Comparison of Winter and Summer

Before discussing the effects of work load, water intake, calorie intake, and protein/carbohydrate/fat ratios on ketone body metabolism, it is necessary to inquire whether there were specific effects of temperature (or season) on ketone body metabolism in general. In the pre-periods urinary excretion was significantly greater in winter (Table AIX.19A) at the 5% level in 20 of 25 comparisons. No significant differences were apparent in serum concentration (Table AIX.19B) and only a few in urine/serum concentration ratios (Table AIX.19C, 6 of 25 comparisons). In renal clearance, winter groups were higher at the 5% significance level in 13 of 25 comparisons (Table AIX.19D). We conclude that in the well fed, fully hydrated individual winter increases total ketone production without great effect on kidney function with respect to total ketone bodies.

In the experimental periods, multiple changes of regimen were imposed, when the subjects moved into the field. Hence, an appropriate comparison may be made on the basis of individual regimens (Table AIX.20). The results were similar for hard work groups, light work groups and controls (FRA) alike. A large majority of paired comparisons were higher with respect to urinary excretion in PRE II, EXP I, and EXP II (Figures AIX.1 and AIX.2). In EXP I and EXP II, serum concentrations were generally higher in winter as well as renal clearance, whereas U/S ratios were not substantially greater except among controls.

It is to be emphasized that these increases in winter occurred even in the antiketogenic regimens 0/100/0 and 15/52/33. It is as if the cold weather "sets" the ketone body production at a higher level than it holds in warm weather. We postulate that the effect is not necessarily seasonal, but closely connected with day to day fluctuations in temperature, and support this hypothesis with the data in Table AIX.21.

TABLE AIX.19

STATISTICAL EVALUATION OF PRE-PERIOD DATA ON TOTAL KETONE BODIES: SUMMER (1955) COMPARED WITH WINTER (1954)

(Each group was compared with all other groups by Fisher's "t" test. NS means the probability of chance was 0.10. Numbers refer to actual probability.)

A. URINARY EXCRETION (μMol/min)

	Summer (1955)				
Winter (1954)	Fgt 1	Fgt 2	Fgt 3	Fgt 4	FRA
Fgt 1	.02	.03	.04	.03	NS
Fgt 2	<.01	<.01	<.01	<.01	.07
Fgt 3	<.01	.02	.02	.02	NS
Fgt 4	<.01	.01	.02	.01	NS
FRA	<.01	<.01	<.01	<.01	.07

B. SERUM CONCENTRATION (mMol/L)

	Summer (1955)				
Winter (1954)	Fgt 1	Fgt 2	Fgt 3	FGt 4	FRA
Fgt 1	NS	NS	NS	NS	NS
Fgt 2	NS	NS	NS	NS	NS
Fgt 3	NS	NS	NS	NS	NS
Fgt 4	.08	NS	NS	NS	NS
FRA	.10	NS	NS	NS	NS

C. URINE/SERUM CONCENTRATION RATIO

	Summer (1955)				
Winter (1954)	Fgt 1	Fgt 2	Fgt 3	Fgt 4	FRA
Fgt 1	NS	NS	NS	NS	NS
Fgt 2	<.01	.04	.01	.02	.06
Fgt 3	NS	NS	NS	NS	NS
Fgt 4	.08	NS	.09	NS	NS
FRA	.04	NS	.05	.09	NS

D. RENAL CLEARANCE (ml/min)

	Summer (1955)				
Winter (1954)	Fgt 1	Fgt 2	Fgt 3	Fgt 4	FRA
Fgt 1	NS	.10	NS	.04	NS
Fgt 2	.01	<.01	<.01	<.01	.07
Fgt 3	.02	.01	.01	<.01	.06
Fgt 4	NS	.09	.10	<.04	NS
FRA	.06	.03	.03	.01	.10

TABLE AIX.20

TOTAL KETONE BODIES: COMPARISON OF WINTER AND SUMMER BY INDIVIDUAL REGIMENS (PRE II, EXP I, AND EXP II)

Period and Group		Comparisons (Number)	Urinary Excretion (μMol/min)	Serum Concentration (mMol/L)	U/S Ratio	Renal Clearance (ml/min)
PRE II	Hard Work	20	19	14	19	19
	Light Work	20	20	12	17	20
	Controls	4	4	2	4	4
EXP I	Hard Work	20	19	18	15	18
	Light Work	19	17	17	10	14
	Controls	4	4	3	4	4
EXP II	Hard Work	19	14	18	9	9
	Light Work	19	17	14	13	17
	Controls	4	4	1	4	4

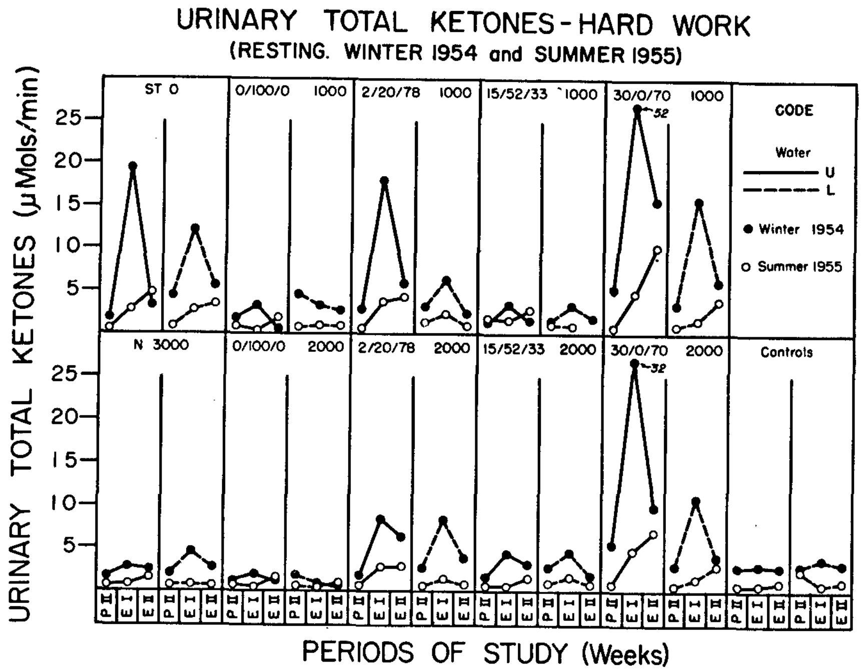

FIGURE AIX.1. URINARY TOTAL KETONES:
HARD WORK

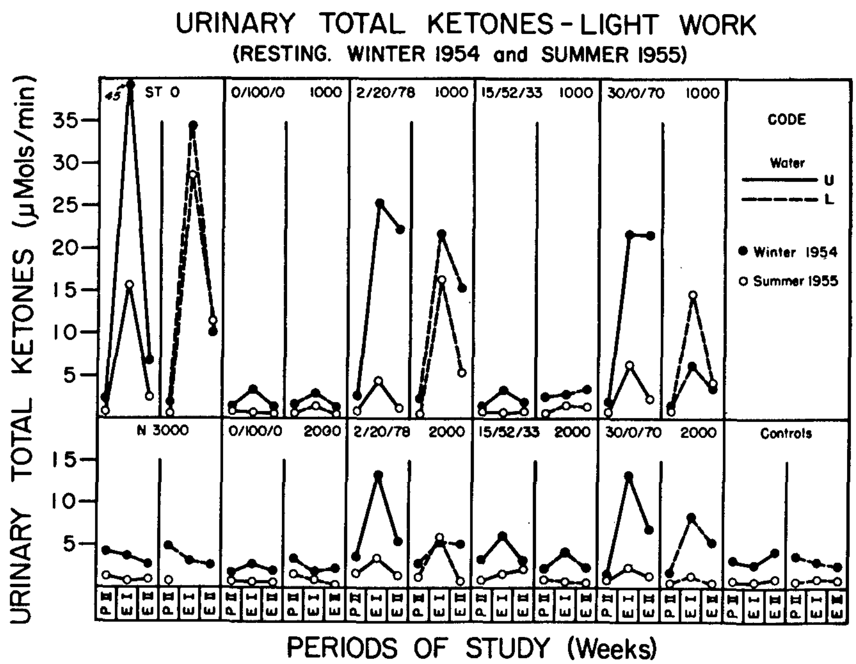

FIGURE AIX.2 URINARY TOTAL KETONES:
LIGHT WORK

TABLE AIX.21

TOTAL KETONE BODIES: CORRELATION BETWEEN MEAN DAILY TEMPERATURE AND CHANGES FROM EXP I TO EXP II, (Paired comparisons by Regimen, Summer, 1955, and Winter 1954)

Measurement and Group	EXP I VS. EXP II Summer 1955 Comparisons (Number)	EXP I Higher Number	Temperature EXP I (°F)	Temperature EXP II (°F)	Winter 1954 Comparisons (Number)	EXP I Higher Number	Temperature EXP I (°F)	Temperature EXP II (°F)
Urinary Excretion (μMol/min)								
Hard Work	21	4	83	79	22	22	26	36
Light Work	21	17	80	79	22	18	26	36
Serum Concentration (mMol/L)								
Hard Work	21	9	83	79	22	21	26	36
Light Work	21	9	80	79	22	19	26	36
Urine/Serum Ratio								
Hard Work	21	10	83	79	22	18	26	36
Light Work	21	15	80	79	22	20	26	36
Renal Clearance (ml/min)								
Hard Work	21	6	83	79	22	18	26	36
Light Work	21	17	80	79	22	15	26	36

In the summer, subjects in EXP I and EXP II were tested on different days, Flights 1 and 2 on Test Day 1 and Flights 3 and 4 on Test Day 2. For the hard work groups there was, comparing the 24 hours before EXP I and EXP II, a decrease of mean temperature of 4°F. EXP II values for urinary excretion, serum concentration, urine/serum ratio, and clearance all tended to be higher in EXP II, regimen by regimen. The opposite was true for light work groups, whose environmental temperature remained essentially unchanged.

In the winter study all subjects in EXP I and EXP II were studied on the same test days. There was a "heat wave" between EXP II and EXP I, with a mean rise of 10°F (Table AIX.21). A large majority of paired comparisons of urinary excretion, serum concentration, urine/serum concentration, and renal clearance were substantially higher in EXP I than in EXP II, which was comparatively warm.

We cannot with our present data distinguish among seasonal effects, direct temperature effects, or possible "adaptation" to ketogenic regimens. A clear-cut answer could be obtained in environmentally controlled chambers, with subjects on strictly controlled regimens.

6. Effects of Daily Work Load, Water Intake, and Calorie Intake

After establishing a definite effect of temperature, we must now inquire whether effects, common to winter as well as summer, can be discerned in relation to daily work load (hard or light), water intake (limited or unlimited), and calorie intake (1000-Calorie regimens compared with 2000-Calorie regimens of the same protein/carbohydrate/fat ratios) (Figures AIX.1 and AIX.2).

Paired comparisons for all regimens in EXP I and EXP II, hard and light being the variables in question, are in Table AIX.22. No striking effect of work load is apparent in any of the four measurements, especially in summer. Perhaps, in winter, values tend to be somewhat higher in light work, except for serum concentration.

Water intake has an interesting effect upon ketosis (Table AIX.23). In a majority of paired comparisons, urinary excretion, serum concentration, and renal clearance of total ketone bodies are all higher in well hydrated subjects, whereas, as would be expected, urine/serum ratios are lower. The effect upon serum concentration is puzzling, because it leads to the conclusion that ketone body production is greater in the hydrated subjects than in the dehydrated on the same regimen. We can only postulate that the intermediary metabolism of the body proceeds in a fluid matrix, the concentration of which will affect processes such as ketogenesis. Dehydration may inhibit the enzyme activity to some extent and actually reduce ketosis.

TABLE AIX.22

TOTAL KETONE BODIES: EFFECT OF WORK LOAD
(Paired Comparisons by Regimen, Summer,
1955, and Winter, 1954, EXP I Plus EXP II)

HARD WORK VS. LIGHT WORK

	Summer 1955		Winter 1954	
Measurement	Comparisons (Number)	Hard Work (Higher Number)	Comparisons (Number)	Hard Work (Higher Number)
Urinary Excretion (μMol/min)	37	17	40	15
Serum Concentration (mMol/L)	37	19	40	26
Urine/Serum Ratio	37	15	40	13
Renal Clearance (ml/Min)	37	20	40	12

Calorie intake also has an effect upon ketosis, even when the protein/-carbohydrate/fat ratio (in classical terms, the "ketogenic antiketogenic ratio") is unchanged (Table AIX.24). Effects were somewhat more striking in summer than in winter. However, in both, a large majority of comparisons were higher at 1000 Cal/day than at 2000 Cal/day, with respect to urinary excretion, serum concentration, and urine/serum ratio. Renal clearance was unaffected in winter by increased calorie intake, but tended to decrease in summer.

TABLE AIX.23

TOTAL KETONE BODIES: EFFECT OF DEHYDRATION
(Paired Comparisons by Regimen, Summer,
1955, and Winter 1954, EXP I Plus EXP II)

UNLIMITED WATER VS. LIMITED WATER

	Summer 1955		Winter 1954	
Measurement	Comparisons (Number)	Unlimited Water (Greater Number)	Comparisons (Number)	Unlimited Water (Greater Number)
Urinary Excretion (μMol/min)	37	23	40	31
Serum Concentration (mMol/L)	37	23	40	33
Urine/Serum Ratio	37	14	40	8
Renal Clearance (ml/min)	37	21	40	25

TABLE AIX.24

TOTAL KETONE BODIES: EFFECTS OF INCREASED CALORIE INTAKE (Paired Comparisons by Regimen, Summer, 1955, and Winter, 1954, EXP I Plus EXP II)

1000-CALORIE REGIMENS VS. 2000-CALORIE REGIMENS				
	SUMMER 1955		WINTER 1954	
Measurement	Comparisons (Number)	1000-Calories (Greater Number)	Comparisons (Number)	1000-Calories (Greater Number)
Urinary Excretion (μMol/min)	31	24	32	17
Serum Concentration (mMol/L)	31	26	32	30
Urine/Serum Ratio	31	22	32	20
Renal Clearance (ml/min)	31	18	32	14

These effects of temperature, water, and calories justify regrouping the data to emphasize their combined effects (Tables AIX.25 and AIX.26). Both hard and light work groups are combined, as well as EXP I and EXP II data. Distribution curves have been constructed for serum concentration, and all values for specimens within a given serum range have been averaged, regardless of protein/carbohydrate/fat ratio. Separate categories have been recognized for winter and summer, 1000-and 2000-Calorie regimens, and water unlimited or restricted. Table AIX.25 demonstrates clearly that urinary concentration tends to increase with increasing serum concentration, especially in winter. This effect, both in winter and in summer is diminished by dehydration and by increased calorie intake. However, there is no convincing evidence of a "threshold phenomenon." If a threshold were present, the U/S ratio would increase stepwise with serum concentration. It remains relatively unchanged in winter and even decreases in summer data.

Urinary excretion and renal clearance are in Table AIX.26. As would be expected, urinary excretion per minute increases with increasing serum concentration. However, the renal clearance does not increase with increased total ketone body excretion or with increased serum concentration. This fact tends to support the "increased production" hypothesis for winter, as opposed to the "renal retention" hypothesis, especially since clearances in winter are higher than in summer. Urinary excretion along with high serum concentrations is diminished by dehydration and by increased calorie intake. This latter point casts strong doubt on the classical concept of a "ketogenic-antiketogenic ratio" and necessitates thinking in absolute terms of the calorie deficit, the intake of carbohydrate, and the intake of fat, all three contributing to ketogenicity of a particular regimen.

7. Discussion

Both the practical and theoretical implications of these quantitative

studies on ketone body metabolism at rest are potentially of the greatest importance in elucidating some of the physiological and clinical problems of survival in environmental extremes. Among the practical considerations are ketone bodies as representing wasted energy; and the deleterious effects of continued ketosis. Among the theoretical implications are the central place which ketone body metabolism must assume in any consideration of human adaptations to heat and cold; the mysterious effect of dehydration in ameliorating ketosis; the fallacy of the classic concept of the "ketogenic-antiketogenic ratio" as an explanation for the ketogenicity of a given dietary regimen; the possibility of assessing the effects of residual starvation in undernourished men by studies of ketone body metabolism; and the non-threshold behavior of the kidney's handling of ketone bodies.

Ketosis represents wasted energy for the body. In the first week of meat bar at 1000 Cal/day in winter, the subjects were excreting some three grams of total ketone bodies daily in the urine. In addition, in the serum and other body fluids they must have accumulated up to 12 grams in excess of normal. These 15 grams in urine and body fluids represent pure wasted energy, not usuable for heat or muscular movement. Clearly, ketogenic regimens should be avoided in survival rations.

Ketosis clinically is well-known to be deleterious. It interfers with acid-base, balance and respiration, and causes inefficiency of cerebral function. Fisher (1951) has recently reviewed the evidence for the toxicity of the ketone bodies although when present in large amounts, the ketone bodies - - particularly acetoacetic acid - - are toxic, it has not been definitely proven that at blood levels occurring in diabetic acidosis, the ketones are toxic. More probably they are indicators of a severe metabolic derangement rather than the principal agents causing the sympton-complex of diabetic acidosis and coma. Loeb (1951, p.625) expresses a similar view regarding the potentially toxic effects of these substances: "The accumulation of beta hydroxybutyric acid in the body is relatively harmless except for its effect upon acid-base equilibrium. On the other hand, acetoacetic acid and acetone are distinctly toxic, and their accumulation depresses the central nervous system." Because of these facts, we would disagree with those who argue that ketosis in the castaway is harmless. In short, ketosis must be considered harmful unless proven otherwise. This is another compelling reason to avoid ketogenic regimens for survival rations.

The unequivocal quantitative demonstration that ketone body metabolism changes markedly between summer and winter, taken together with the work of Sargent and Consolazio (1951), Sargent (1954), and Sargent and Johnson (1956) based on qualitative studies, suggests that one of the major generalizations on human responses to heat and cold will be established by a systematic study of fat and carbohydrate metabolism in different environments. A tendency toward ketosis is accentuated by exposure to cold. At the same time, the same ketogenic regimen is more hypoglycemic in the cold than in the heat. Clearly, exposure to cold exercises a profound influence on those bodily functions which have to do with fat and carbohydrate metabolism. It is tempting to speculate that we are dealing with a pituitary-adrenal phenomenon, central to the adaptation of man to environmental extremes.

TABLE AIX.25

DISTRIBUTION CURVES: KETONE BODY CONCENTRATION IN SERUM VS. URINARY CONCENTRATION AND URINE/SERUM RATIO BY REGIMENS

Serum Concentration, Ranges mMol/L

Regimen and Measurement	0 to 0.59	0.6 to 0.99	1 to 1.99	2 to 2.99	3 to 3.99	4 to 4.99	5 to 5.99	6 and over
A. Winter 1954								
1000 Cal, Water U								
Samples	3	22	25	6	25	9	4	6
Urine, mMol/L	1.00	3.37	6.73	5.29	18.56	10.50	25.64	33.94
U/S Ratio	4.76	4.32	5.10	2.16	5.21	2.44	5.09	4.04
1000 Cal, Water L								
Samples, %	0	19	32	29	11	6	3	0
Urine, mMol/L	--	7.07	7.26	17.06	20.81	16.65	28.98	--
U/S Ratio	--	9.11	6.00	6.42	6.51	3.94	5.55	--
2000 Cal, Water U								
Samples, %	13	20	29	26	6	6	0	0
Urine, mMol/L	3.30	3.61	4.42	6.40	4.48	26.05	--	--
U/S Ratio	7.28	5.08	3.44	2.64	1.46	5.88	--	--
2000 Cal, Water L								
Samples, %	25	22	34	16	0	3	0	0
Urine, mMol/L	5.23	4.94	8.42	5.86	--	19.49	--	--
U/S Ratio	10.36	6.19	5.46	2.49	--	4.71	--	--

TABLE AIX.25 (Contd)

DISTRIBUTION CURVES: KETONE BODY CONCENTRATION IN SERUM VS. URINARY CONCENTRATION AND URINE/SERUM RATIO BY REGIMENS

Serum Concentration, Ranges, mMol/L

Regimen and Measurement	0 to 0.59	0.6 to 0.99	1 to 1.99	2 to 2.99	3 to 3.99	4 to 4.99	5 to 5.99	6 and over
B. Summer 1955								
1000 Cal, Water U								
Samples, %	23	46	19	8	4	0	0	0
Urine, mMol/L	1.73	5.20	5.55	8.02	6.32	--	--	--
U/S Ratio	3.34	6.44	3.87	3.23	1.69	--	--	--
1000 Cal, Water L								
Samples, %	19	46	15	12	8	0	0	0
Urine, mMol/L	2.23	5.75	13.84	6.83	3.17	--	--	--
U/S Ratio	6.09	6.85	10.30	2.73	0.98	--	--	--
2000 Cal, Water U								
Samples, %	59	25	13	3	0	0	0	0
Urine, mMol/L	1.56	2.62	2.56	7.01	--	--	--	--
U/S Ratio	3.13	3.65	2.46	2.46	--	--	--	--
2000 Cal, Water L								
Samples, %	47	34	16	3	0	0	0	0
Urine, mMol/L	1.88	4.67	2.26	2.12	--	--	--	--
U/S Ratio	4.19	5.76	1.38	0.97	--	--	--	--

TABLE AIX.26

DISTRIBUTION CURVES: KETONE BODY CONCENTRATION IN SERUM
VS. URINARY EXCRETION RATE AND RENAL CLEARANCE

Serum Concentration, Ranges mMol/L

Regimen and Measurement	0 to 0.59	0.6 to 0.99	1 to 1.99	2 to 2.99	3 to 3.99	4 to 4.99	5 to 5.99	6 and over
A. Winter 1954								
1000 Cal, Water U								
Samples, %	3	22	25	7	25	9	3	6
Excretion, µMol/min	1.20	1.81	2.83	6.07	20.11	19.14	24.81	55.64
Clearance, ml/min	5.71	2.40	2.20	2.48	5.69	4.39	4.92	6.66
1000 Cal, Water L								
Samples, %	0	19	32	29	10	6	3	0
Excretion, µMol/min	--	2.42	2.85	9.35	10.81	9.67	16.50	--
Clearance, ml/min	--	3.02	2.28	3.51	3.35	2.30	3.16	--
2000 Cal, Water U								
Samples	12	24	24	27	7	6	0	0
Excretion, µMol/min	1.90	2.65	6.59	9.43	6.21	36.90	--	--
Clearance, ml/min	3.83	3.01	4.85	3.90	2.03	8.40	--	--
2000 Cal, Water L								
Samples, %	22	25	34	16	0	3	0	0
Excretion, µMol/min	1.95	2.63	5.29	5.91	--	14.57	--	--
Clearance, ml/min	3.82	3.41	3.20	2.54	--	3.52	--	--

TABLE AIX.26 (Contd)

DISTRIBUTION CURVES: KETONE BODY CONCENTRATION IN SERUM VS. URINARY EXCRETION RATE AND RENAL CLEARANCE

Serum Concentration, Ranges, mMol/L

Regimen and Measurement	0 to 0.59	0.6 to 0.99	1 to 1.99	2 to 2.99	3 to 3.99	4 to 4.99	5 to 5.99	6 and over
B. Summer 1955								
1000 Cal, Water U								
Samples, %	23	46	19	8	4	0	0	0
Excretion, μMol/min	0.79	2.43	4.24	5.18	7.51	--	--	--
Clearance, ml/min	1.54	3.03	3.06	2.06	2.00	--	--	--
1000 Cal, Water L								
Samples, %	19	46	16	12	7	0	0	0
Excretion, μMol/min	0.89	3.33	9.16	4.01	1.58	--	--	--
Clearance, ml/min	2.30	3.84	6.61	1.51	0.49	--	--	--
2000 Cal, Water U								
Samples, %	59	25	12	3	0	0	0	0
Excretion, μMol/min	1.29	2.18	2.96	11.64	--	--	--	--
Clearance, ml/min	2.62	3.02	2.86	4.08	--	--	--	--
2000 Cal, Water L								
Samples, %	37	42	13	8	0	0	0	0
Excretion, μMol/min	0.81	2.08	1.23	1.12	--	--	--	--
Clearance, ml/min	1.91	2.62	0.75	0.52	--	--	--	--

We can only speculate on why dehydration diminished ketosis both in summer and in winter. To our knowledge, no other investigators have detected this phenomenon. Our speculation is that a normal fluid matrix permits the intermediary metabolism of liver and muscle to proceed normally. Intracellular dehydration might diminish the efficiency of the enzyme-substrate complexes responsible for ketosis.

Our observations cast serious doubt on the classical concept of a "ketogenic-antiketogenic ratio" which determines whether or not there shall be complete combustion of fat (Lusk, 1928). In our human subjects on paired feeding, a given regimen, e.g. 2/20/78 or 30/0/70, at 2000 Cal/day is substantially less ketogenic than the same regimen at 1000 Cal/day, in spite of the fact that the alleged "ketogenic-antiketogenic ratio" is identical. We suggest replacing the old concept with a new one, in which the factors of temperature, calorie balance, absolute fat intake, absolute carbohydrate intake (or intake of gluconeogenetic precursors), and state of hydration are all given due consideration as they relate to ketosis. The older concept does not explain our results at all satisfactorily; the newer one does.

These observations give a real clue to the problem of "residual starvation" in the calorically undernourished human. When the subject is in negative calorie balance, part of his metabolism comes from food he has ingested; the rest of it must come from his own tissues, i.e. from "residual starvation." How to account quantitatively for this "residual starvation" in metabolic studies has remained a mystery. Nitrogen balance has been used, because tissue degradation contributes to nitrogen loss. However, nitrogen balance alone has proved unsatisfactory because of the "sparing effect" of calories on nitrogen degradation. We have observed that serum concentration of total ketone bodies within a given regimen correlates closely with caloric deficit. To be sure, an antiketogenic regimen such as pure carbohydrate at 1000 Cal/day does not raise the serum concentration of total ketone bodies nearly as high as does a ketogenic regimen such as a high protein-high fat regimen at 1000 Cal/day. Nevertheless, even with pure carbohydrate, the serum level is less at 2000 Cal/day than at 1000 Cal/day. We postulate that "residual starvation" accounts for this difference. We suggest that studies of fat and carbohydrate metabolism will assist in elucidating the phenomenon of "residual starvation."

A final problem concerns the non-threshold excretion of ketone bodies by the kidney. Our data indicate that up to blood levels of 6mM/L of Ketone bodies (approximately 35 mg/100 ml), no increase in U/S ratio occurs. In fact, there may even be a fall in the U/S ratio with increasing blood levels. If we deal with a threshold, the U/S ratio should increase abruptly at some blood level. Judging from the literature, the blood levels of our subjects exceeded the postulated threshold of 20 mg/100 ml.

The "threshold" concerns acetoacetate and beta hydroxybutyrate. Acetone enters the urine by simple diffusion (Widmark, 1920; Briggs and Shaffer, 1921). Widmark (1920), Shipley and Long (1938), Shipley (1940), Friedemann (1942), and Martin and Wick (1943) have demonstrated in various mammals, that acetoacetate and beta hydroxybutyrate are threshold substances. Martin and Wick

(1943) reported that, in the human, when ketonemia was less than 20mg/100ml, the urinary output of ketone bodies was low (less than 100mg/hr). The urinary ketones were largely acetone and acetoacetic acid. When the ketonemia exceeded 20mg/100ml, large quantities of beta hydroxybutyric acid appeared. Above the ketonemic level of 20mg/100ml, there was a linear relation between rate of ketone body excretion and the level of ketone bodies in the blood. It was concluded that beta hydroxybutyric acid, and not acetone or acetoacetate, was a threshold substance. Our data, in contrast, show a progressive, not abrupt, rise in rate of excretion of ketone bodies with increasing concentration of serum but the urine/serum concentration ratio remains essentially constant over the entire range of serum values. A study by Visscher (1945) on renal clearance of beta hydroxybutyric acid in the dog supports our inferences. Contrary to previous work, he found appreciable quantities of beta hydroxybutyrate in the urine when the serum concentration of this substance was as low as 8mg/100ml. With increasing serum concentrations, there was a gradual, not precipitate, rise in the rate of urinary excretion. These various observations suggest to us that the historical concept of "threshold" - - which was based largely on qualitative data - - should be abandoned.

Friedemann (1942) using the monkey and man, and Visscher (1945) and Schwab and Lotspeich (1954) using the dog, have demonstrated that acetoacetic acid and beta hydroxybutyric acid are actively re-absorbed by the renal tubule. Our low clearance values suggest a similar process.

8. Summary and Conclusions

1. A rapid and quantitative colorimetric method is described for estimating acetone, acetoacetate, beta hydroxybutyrate and their sum (total ketone bodies) in serum, urine, and sweat. It is an improvement over previous methods, of which it is a modification, in that mol for mol (i.e. true theoretical) production of acetone from beta hydroxybutyrate is made possible by metaphosphoric acid catalysis of the oxidation of beta hydroxybutyrate by dichromate in strong acid solution at temperatures above 100°C, which are produced in an autoclave.

2. Observations on ketone body metabolism at rest are reported for 100 healthy male subjects in summer, and for another 100 healthy male subjects in winter. Under standard conditions of rest and recumbency, timed specimens of urine were collected, as well as specimens of blood. After analysis for total ketone bodies, estimates were calculated of rate of urinary excretion, serum concentration, urinary/serum concentration ratios, and renal clearance.

3. In winter, rate of urinary excretion of total ketone bodies was significantly greater than in summer. This was true even in well hydrated, well nourished men not subsisting on a ketogenic regimen. At the same time, serum concentration, urine/serum concentration ratio, and renal clearance were not altered between winter and summer to nearly the same degree as rate of urinary excretion of total ketone bodies.

4. The ketogenicity of any given dietary regimen was enhanced by

cold weather as compared with warm weather. These differences cannot be due to sweat, which contains little or no total ketone bodies.

5. Regardless of temperature, the ketogenicity of any given regimen was affected profoundly by two other factors:

a) Dehydration reduced both serum concentration and rate of urinary excretion.
b) Increased intake of calories of the same nutrient mixture reduced both serum concentration and rate of urinary excretion.

6. Mean renal clearance never exceeded 10 ml/min, even in regimens which raised the serum concentration. This fact implies a very active renal reabsorption of total ketone bodies, similar in magnitude to that for sodium and chloride.

7. All the data are consistent with the hypothesis that reduction of environmental temperature increases the production of total ketone bodies, whereas dehydration and increased calorie intake decrease such production.

8. Ketogenic regimens should be avoided for survival rations for two important practical reasons:

a) Ketosis implies pure waste of food energy.
b) Clinically, ketosis must be considered deleterious until proved otherwise.

9. Five considerations of considerable theoretical importance are discussed:

a) Because of the profound effects of environmental temperature on ketone body metabolism, these compounds may be central to the problem of human adaptation to heat and cold.
b) The mysterious effect of dehydration in diminishing ketosis may have an important bearing in the fluid matrix in which the body conducts metabolic processes.
c) The older concept of "ketogenic - antiketogenic ratio" as controlling the ketogenicity of a regimen is almost certainly invalid. It must be replaced by a more general concept in which environmental temperature, calorie balance, state of hydration, absolute intake of fat and absolute intake of carbohydrate (or its precursors) are all considered simultaneously.

d) It is possible that in calorically undernourished subjects, state of ketone body metabolism correlates closely with the "residual starvation" associated with negative caloric balance.

e) Our data suggest that the concept of "threshold" is not valid with reference to the renal excretion of ketone bodies. While there most certainly is an active tubular reabsorption of these

substances, the urine/serum concentration ratio of ketone bodies does not increase even when serum levels exceed 6mM/L of total ketone bodies. In point of fact, the U/S ratio may decrease with increasing serum concentrations.

B. KETONE BODY METABOLISM DURING AND AFTER MUSCULAR WORK IN MOIST HEAT

1. Introduction

In view of the important conclusions which have been reached as a result of studies on the total ketone bodies in serum and urine from subjects at rest, together with the calculations on kidney functions that can be derived from such data, the question must be asked: what, if any, differences in ketone body metabolism are caused by muscular exercise? This section incorporates observations on men during and after the heat acclimatization test, a one hour march at a fixed pace of 3.75 m.p.h. at a mean temperature of about 90°F, R.H. about 65%. Specimens of sweat and urine were collected during the march, and again urine was collected for one hour after the march. It was impractical to collect samples of blood. Unfortunately, no comparable test was run on subjects in winter, so that no conclusions will be possible concerning effects of heat and cold. However, it will be possible (for moist heat) to discuss urinary concentration of total ketone bodies during and after exercise, rate of urinary excretion during and after exercise, excretion of total ketone bodies by the sweat gland, and the effects of water intake and dietary regimen on these physiological functions.

2. Urinary Excretion of Total Ketone Bodies During Exercise

Pre-period data for urinary excretion during exercise are shown in Table AIX.27; Flight 1 was significantly lower than the FRA. Otherwise, there were no significant flight differences, owing to the rather large coefficients of variation.

TABLE AIX.27

PRE-PERIOD DATA ON TOTAL KETONE BODIES: RATE OF URINARY EXCRETION DURING AND AFTER MUSCULAR WORK (MARCHING ONE HOUR) (micromol/min; heat acclimatization test, Summer 1955, PRE II)

Flight	N	Mean	Range	s.d.	C.V.
		A. Urine Collected During Exercise*			
1	21	1.13	0.48 - 2.56	0.58	51
2	20	1.27	0.12 - 2.42	0.65	51
3	20	1.41	0.48 - 2.50	0.53	38
4	21	1.29	0.66 - 2.54	0.60	46
FRA	11	2.05	0.63 - 3.62	0.91	44

TABLE AIX.27 (Contd)

Flight	N	Mean	Range	s.d.	C.V.
		B. Urine Collected After Exercise**			
1	21	1.70	0.24 - 3.61	0.88	52
2	20	1.53	0.84 - 2.76	0.71	47
3	20	2.05	1.13 - 3.49	0.59	29
4	22	1.94	0.88 - 4.58	0.83	43
FRA	11	2.52	1.08 - 5.02	1.17	46

* When all means were compared against all other means by Fisher's "t" test, the value for Flight 1 against FRA was significant at the 5% level. No other comparisons were significantly different.

** No group means were significantly different at the 5% level.

For different regimens in EXP I, data are presented in Table AIX.28. For both hard work and light work the ketogenic regimens ST0 and 30/0/70 increased excretion in exercise independently of water limitation, and the antiketogenic regimens 0/100/0 2000, 15/52/33 1000, 15/52/33 2000, and 15/52/33 3000 evoked but slight differences between PRE II and EXP. In hard work groups, as well as light work, 0/100/0 1000 was associated with an increased excretion in EXP, proving that pure carbohydrate does not necessarily completely inhibit ketosis. The high fat - low protein regimen 2/20/78 provoked ketosis only in 2/20/78 1000 U, Hard Work, and 2/20/78 2000 L, Light Work.

TABLE AIX.28

HEAT ACCLIMATIZATION TEST: URINARY TOTAL KETONE BODY EXCRETION DURING EXERCISE (mMol/min)

Experimental Regimen		Hard Work PRE II	Hard Work EXP	Light Work PRE II	Light Work EXP
ST 0	U	1.35	3.52	1.05	2.68
	L	1.40	5.95	1.40	10.21
0/100/0	U	0.65	1.70	1.53	3.34
1000	L	0.12	1.93	0.91	2.51
0/100/0	U	0.87	1.09	0.94	0.97
2000	L	0.62	0.72	1.34	1.40
2/20/78	U	1.90	3.58	1.94	1.11
1000	L	1.79	0.84	0.94	1.01
2/20/78	U	1.03	1.67	2.50	1.05
2000	L	1.34	1.05	2.02	4.00
15/52/33	U	0.73	1.14	1.18	1.09
1000	L	1.04	1.22	2.26	1.50

TABLE AIX.28 (Contd)

Experimental Regimen		Hard Work PRE II	Hard Work EXP	Light Work PRE II	Light Work EXP
15/52/33	U	1.24	1.74	1.41	1.05
2000	L	1.69	2.31	1.24	1.73
15/52/33	U	1.65	1.51	1.96	1.37
3000	L	2.26	2.29	0.76	ND
30/0/70	U	0.67	12.53	1.56	5.20
1000	L	0.73	5.37	0.84	6.55
30/0/70	U	0.82	2.98	1.20	1.48
2000	L	0.93	4.51	0.98	6.48
FRA	U	1.22	1.67	2.00	1.80
	L	2.16	3.86	2.90	2.80

3. Urinary Excretion of Total Ketone Bodies After Exercise

After marching one hour, the subjects rested another hour while collecting timed specimens of urine. Results for the pre-period are summarized in Table AIX.27-B. Because of the rather large coefficients of variations, group means were not significantly different. Each flight excreted ketones at a faster rate after exercise than during.

During the experimental period, there were some interesting differences between regimens (Table AIX.29). Regardless of work load or water intake, ketonuria after exercise was caused by STO and 30/0/70 1000. In hard work, 30/0/70 2000 was strongly ketogenic, 2/20/78 1000 and 2000 much less so. In light work, mild ketonuria after exercise was provoked by 30/0/70 2000, 2/20/78 1000, and 2/20/78 2000. Limitation of water decreased the ketonuria after exercise in 30/0/70 1000, 30/0/70 2000, 2/20/78 1000, and 2/20/78 2000 in hard work; and in 30/0/70 1000 and 30/0/70 2000 for light work.

TABLE AIX.29

HEAT ACCLIMATIZATION TEST: URINARY KETONE BODY EXCRETION AFTER TEST (mMol/min)

Experimental Regimen		Hard Work PRE II	Hard Work EXP	Light Work PRE II	Light Work EXP
ST 0	U	1.02	8.46	1.76	12.62
	L	1.39	10.65	1.38	14.21
0/100/0	U	2.04	1.92	2.62	2.46
1000	L	1.53	2.64	1.32	2.70
0/100/0	U	1.38	1.48	2.24	1.70
2000	L	1.59	1.48	1.51	1.44

TABLE AIX.29 (Contd)

Experimental Regimen		Hard Work PRE II	Hard Work EXP	Light Work PRE II	Light Work EXP
2/20/78	U	2.77	4.75	1.78	2.66
1000	L	1.38	2.90	1.72	4.30
2/20/78	U	1.26	2.88	3.44	2.01
2000	L	1.38	2.72	2.60	5.28
15/52/33	U	2.37	1.74	1.64	1.71
1000	L	1.13	2.49	2.20	2.36
15/52/33	U	0.78	2.64	2.22	1.34
2000	L	2.24	2.27	1.54	1.78
15/52/33	U	2.66	2.66	2.31	2.26
3000	L	1.24	2.94	3.27	ND
30/0/70	U	1.45	14.08	1.70	15.32
1000	L	1.12	10.36	1.84	7.49
30/0/70	U	2.36	11.89	1.41	4.16
2000	L	1.30	8.94	2.64	2.33
FRA	U	2.33	1.95	1.91	1.92
	L	3.16	4.01	2.92	3.29

4. Comparison of Urinary Excretion at Rest, During and After Exercise

In order to clarify the changes of ketone body metabolism between rest and post-exercise, we have evaluated statistically the difference for PRE II by individual flights (Table AIX.30). Rate of excretion during exercise was not significantly different from rate of excretion at rest, nor was post-exercise significantly greater than exercise. However, because there were, in fact, mean differences in which (rest) (exercise) (post-exercise), the post-exercise excretion in Flights 1, 3, and 4 was significantly greater than the resting (compare Tables AIX.7 and AIX.27). One could interpret these data as meaning for the well hydrated, adequately fed subject a slight but not significant increase in ketone body turnover in exercise and an incipient Courtice-Douglas effect (Courtice and Douglas, 1936; Courtice, Douglas, and Priestly, 1939) in the first hour after exercise: production of ketone bodies increases, with increased urinary excretion, after cessation of exercise.

When calculation is made of the absolute differences between rest and exercise and rest and post-exercise by regimen, these changes in the preperiod are brought out clearly (Table AXI.31). During exercise, urinary excretion was greater than at rest in 32 of 44 paired comparisons; post-exercise excretion was greater in 44 of 44 paired comparisons. Post-exercise excretion was greater than excretion during exercise in 37 of 44 paired comparisons.

TABLE AIX.30

STATISTICAL EVALUATION: TOTAL URINARY KETONE BODY EXCRETION IN PRE-PERIOD, REST VS. EXERCISE VS. POST-EXERCISE (mMol/min; Heat Acclimatization Test; PRE II; Summer 1955. Flights compared with themselves by Fisher's "t" test.)

Flight	N	Exercise Larger Than Rest P*	After Exercise Larger Than Rest P*	After Exercise Larger Than Exercise P*
1	21	NS	.03	NS
2	20	NS	.10	NS
3	20	NS	.04	NS
4	21	NS	.03	NS
FRA	11	NS	NS	NS

* NS means the difference was not significant at the 10% level.
P means the actual probability against a random difference.

During the experimental period we should consider separately the ketogenic regimens (STO, 2/20/78, 30/0/70) and the non-ketogenic regimens (0/100/0, 15/52/33, FRA), for the reason that in ketosis the resting urinary excretion of total ketone bodies may be very high. Hence, absolute differences may be expected to be more spectacular in ketotic than in non-ketotic individuals. The most consistent effect was between post-exercise and exercise ketonuria. Post-exercise was greater than exercise, on the average, in 21 of 22 comparisons for hard work, and in 20 of 21 comparisons for light work, regardless of the ketogenicity of the regimen. Among the non-ketogenic regimens, as well as among the ketogenic regimens, daily work load and water intake were apparently not significant variables.

If we scrutinize the data when actually grouped by ketogenic vs. non-ketogenic regimens in EXP I, and expressed in relation to each individual subject rather than by grouped averages, several striking regularities appear (Table AIX.32). First, among the non-ketogenic regimens and the controls, work load and water intake had but little influence. However, excretion during exercise was regularly greater than at rest, post-exercise excretion was regularly greater than at rest, and post-exercise excretion was regularly greater than during exercise. In other words, even in non-ketogenic regimens, a Courtice-Douglas effect may be detected within the first hour after exercise. It is not a classical Courtice-Douglas effect in that excretion during exercise is greater than at rest. Nevertheless, this finding certainly confirms and extends the findings of Courtice-Douglas. Second, among ketogenic regimens, a sharp difference existed between subjects daily exercised by 12 miles of marching, and the light-work (resting) subjects. In the former, post-exercise ketonuria was substantially

TABLE AIX.31

TOTAL KETONE BODIES: DIFFERENCE BETWEEN RATE OF URINARY EXCRETION AT REST, DURING AND AFTER EXERCISE (mMol/min.)

Experimental Regimen		PRE II		EXP I		PRE II		EXP I	
		During	After	During	After	During	After	During	After
ST 0	U	+0.76	+0.46	+0.74	+5.68	+0.28	+0.95	-13.07	-5.21
	L	+0.49	+0.62	+3.17	+7.88	+0.81	+0.79	-23.32	-19.34
0/100/0	U	-0.18	+1.22	+1.43	+1.66	+0.78	+1.88	+2.66	+1.78
1000	L	-0.90	+0.75	+1.11	+1.82	+0.24	+0.74	+1.43	+2.01
0/100/0	U	+0.16	+0.67	+0.75	+1.14	+0.40	+1.46	+0.16	+0.90
2000	L	+0.02	+0.99	+0.28	+1.00	-0.31	+0.16	+0.56	+0.59
2/20/78	U	+1.26	+2.13	-0.37	+0.80	+1.09	+0.93	-3.32	-1.77
1000	L	+0.50	+0.08	-1.29	+0.76	+0.54	+1.32	-15.36	-12.06
2/20/78	U	+0.43	+0.53	-1.06	+0.16	+1.46	+2.40	-3.90	-2.94
2000	L	+0.67	+0.71	-0.07	+1.60	+0.76	+1.34	-1.92	-0.64
15/52/33	U	0.00	+1.64	-0.60	+0.01	+0.33	+0.79	-0.39	+1.01
1000	L	+0.71	+0.82	+0.42	+1.69	+1.68	+1.62	+0.37	+0.84
15/52/33	U	+0.66	+0.20	+1.24	+2.15	+0.54	+1.36	-0.41	-0.30
2000	L	+0.83	+1.39	+0.66	+0.62	+0.40	+0.69	+1.37	+1.74
15/52/33	U	+1.08	+2.10	+0.82	+1.97	+0.72	+1.12	+0.66	+1.54
3000	L	+1.64	+1.82	+1.59	+2.24	-0.02	+2.49	ND	ND
30/0/70	U	-0.02	+0.76	+6.62	+9.20	-0.77	+0.91	-1.00	+9.15
1000	L	-0.16	+0.12	+4.01	+9.00	-0.20	+0.90	-8.23	-7.30
30/0/70	U	-0.13	+1.67	-1.78	+7.16	+0.30	+0.67	-0.88	+1.80
2000	L	+0.42	+0.80	+3.36	+7.78	-0.51	+2.14	+5.09	+0.94
FRA	U	+0.56	+1.65	+1.03	+1.31	+1.13	+1.04	+1.04	+1.16
	L	-0.41	+0.63	+3.19	+3.34	+2.15	+2.17	+1.84	+2.33

TABLE AIX.32

TOTAL KETONE BODIES: RATE OF URINARY EXCRETION AT REST, DURING EXERCISE, AND AFTER EXERCISE IN EXPERIMENTAL PERIOD
(mMol/min; Heat Acclimatization Test; EXP I; Summer 1955)

Group and Regimen	Individual Subjects (Number)	Exercise > Rest (Number)	Post-Exercise > Rest (Number)	Post-Exercise > Exercise (Number)
Ketogenic (STO, 2/20/78, 30/0/70)				
Hard Work - Water U	11	6	9	11
Hard Work - Water L	11	7	11	11
Light Work - Water U	10	0	6	10
Light Work - Water L	10	2	3	6
Non-Ketogenic (0/100/0, 15/52/33)				
Hard Work - Water U	10	7	8	9
Hard Work - Water L	8	8	8	7
Light Work - Water U	11	8	10	8
Light Work - Water L	5	4	5	5
Control Subjects (FRA)				
Moderate Work - Water U	11	11	11	8

greater than in exercise or at rest. In the latter, exercise ketonuria was actually less than resting ketonuria in an over-whelming majority of cases, whereas post-exercise ketonuria was not significantly greater than resting. Only the increase between post-exercise and exercise ketonuria was characteristic of all subjects and independent of work load. It would appear that trained subjects exhibit a Courtice-Douglas effect, whereas untrained, especially with limited water, do not do so with nearly as great regularity.

5. Total Ketone Bodies in Sweat

It might be anticipated that a systematic study of ketone bodies would be an interesting contribution to the physiology of sweating, because there are few, if any, observations on this point to be found in the previous literature. Pre-period data included observation on 95 subjects who walked one hour at 3.75 m.p.h. (Tables AIX.33 and AIX.34). The concentration of total ketone bodies is small; on the whole it is lower than that of serum (Table AIX.10A).

TABLE AIX.33

PRE-PERIOD DATA ON TOTAL KETONE BODIES: SWEAT CONCENTRATION
(mMol/L; Summer 1955; Heat Acclimatization Test; PRE II)

Flight	N	Mean*	Range	s.d.	C.V.
1	22	0.44	0.21 - 0.73	0.16	37
2	20	0.55	0.18 - 1.19	0.29	52
3	20	0.27	0.08 - 0.89	0.19	71
4	22	0.80	0.28 - 2.05	0.44	56
FRA	11	0.34	0.22 - 0.47	0.06	18

* When all means were compared with each other by Fisher's "t" test, the difference between Flight 3 and Flight 4 was significant at the 5% level. No other differences were significant.

During experimental and recovery periods, the range of concentration remained narrow, and values were still low. Nevertheless, within the very small range of concentrations we encountered, there were some interesting changes (Table AIX.34). The highest of all values were found in PRE I and EXP. In PRE II, values were substantially lower than in PRE I. In REC I they diminished from EXP, and rose again in the second recovery period. No apparent correlation existed with work load or calorie level. Even in subjects whose high fat intakes induced strong ketosis, the total ketone bodies in the sweat remained low in concentration.

In the light work groups there was in the experimental period a definite effect of dehydration. Dehydrated subjects in seven of nine comparisons had

TABLE AIX.34

CONCENTRATION OF TOTAL KETONE BODIES IN SWEAT: SUMMER 1955
(mMol/L)

Experimental ***Regimen		HARD WORK PRE I	HARD WORK PRE II	HARD WORK EXP I	HARD WORK REC I	HARD WORK REC II	LIGHT WORK PRE I	LIGHT WORK PRE II	LIGHT WORK EXP I	LIGHT WORK REC I	LIGHT WORK REC II
ST 0	U	0.45	0.35	0.87	0.33	0.35	0.83	0.21	0.64	0.38	0.37
	L	0.68	0.52	0.69	0.42	0.50	0.63	0.61	1.29	0.39	0.17
0/100/0	U	0.76	0.22	0.30	0.25	0.24	0.59	0.21	0.78	0.40	0.25
1000	L	0.87	1.19	0.57	0.47	0.60	0.35	0.62	0.96	0.33	0.16
0/100/0	U	0.67	0.26	0.42	0.28	0.28	0.77	0.33	0.78	0.40	0.26
2000	L	0.78	0.58	0.65	0.36	0.48	0.64	0.52	0.74	0.23	0.46
2/20/78	U	----	0.68	0.86	0.38	1.08	0.68	0.18	0.39	0.16	0.21
1000	L	0.66	0.19	0.50	0.46	0.68	0.50	1.22	0.70	0.59	0.52
2/20/78	U	1.16	0.66	0.91	----	----	0.28	0.11	0.42	0.56	0.28
2000	L	0.66	0.50	0.76	0.48	0.92	0.70	1.19	1.20	0.61	0.37
15/52/33	U	1.14	0.60	0.62	0.35	0.53	0.72	0.35	0.65	0.46	0.52
1000	L	0.60	0.19	0.42	----	----	0.72	1.48	1.56	0.64	0.56
15/52/33	U	0.89	0.41	0.39	0.20	----	0.94	0.61	1.48	0.48	0.29
2000	L	0.70	1.19	1.05	0.42	1.07	0.54	0.48	1.15	0.43	0.52
15/52/33	U	0.96	0.40	0.62	0.46	0.44	0.74	0.30	0.98	0.48	0.14
3000	L	0.54	0.54	0.59	0.58	0.38	0.56	0.54	----	----	----
30/0/70	U	0.54	0.36	0.53	0.38	0.41	0.60	0.12	0.40	0.42	0.07
1000	L	0.62	0.59	0.58	0.26	0.61	0.44	0.64	1.22	0.30	0.25
30/0/70	U	1.06	0.44	0.63	0.34	1.03	0.51	0.17	0.38	0.18	0.16
2000	L	0.49	0.42	0.51	0.38	0.70	1.04	0.84	1.29	0.38	0.80
FRA	U	0.46	0.32	0.33	0.40	0.21	0.51	0.30	0.24	0.21	0.11
	L	0.48	0.40	0.37	0.20	0.16	0.77	0.38	0.70	0.19	0.30

TABLE AIX.35

TOTAL KETONE BODIES: CONCENTRATION IN SWEAT (DURING EXERCISE) COMPARED WITH CONCENTRATION IN SERUM (RESTING)
(Heat Acclimatization Test; Hard and Light Work Combined; EXP; Summer 1955.)

Regimen	Serum Concentration, Ranges, (mMol/L) 0 to 0.59	0.6 to 0.99	1 to 1.99	2 to 2.99	3 to 3.99	4 to 4.99	5 and Over
Ketogenic Regimens (ST 0, 2/20/78, 30/0/70)							
Sample, %	12	25	25	23	10	3	2
Sweat, mMol/L	1.02	0.66	0.71	0.81	0.49	0.74	1.08
Non-Ketogenic Regimens (0/100/0, 75/52/33)							
Sample, %	60	34	6	0	0	0	0
Sweat, mMol/L	0.68	0.99	0.54	-	-	-	-
Controls (FRA)							
Sample, %	55	45	0	0	0	0	0
Sweat, mMol/L	0.28	0.58	-	-	-	-	-

the higher average concentration of ketone bodies. This relationship did not occur in the hard work groups.

It is of fundamental importance to explain why the sweat gland produces a fluid which may at the same time be hypotonic to serum (sodium, chloride), isotonic with serum (urea), or hypertonic to serum (lactate, potassium). Although we did not collect blood during the march, we can compare EXP I total ketone body concentration in sweat doing work with serum concentration at rest on the same day (Table AIX.35). The interesting inversion appears that at low serum concentrations, up to one mMol/L, sweat concentration may equal or exceed serum. Above serum concentrations of one mMol/L, and even in subjects who are frankly ketotic, sweat concentration is substantially lower than that of serum. The following hypotheses explaining these phenomena can be offered without proof of correctness: either the sweat gland produces a fluid essentially constant with respect to ketone body concentration or it is blocked in some way by rising serum concentration, or it actually metabolizes ketone bodies in direct proportion to the serum concentration.

Since we know that the kidney measurements, especially those of clearance indicate an active reabsorption of ketone bodies (Table AIX.26), a study of urine/sweat concentration ratios during exercise becomes instructive, to seek for analogies between the function of kidney and sweat gland. Pre-period data are summarized in Table AIX.36. Urine is much more concentrated than sweat, in relation to total ketone bodies, by a factor of from 5 to 20. In the experimental period, these differences persisted (Table AIX.37). In only two sets of paired subjects, both on non-ketogenic regimens at 2000 Cal/day, did the sweat concentration exceed that of the urine. The high urine/sweat ratio persisted whether the subjects were ketotic or not and independently of work load or state of hydration. These data strengthen the conclusion reached for pre-period data, and suggest strongly that an efficient mechanism for maintaining a low sweat concentration of total ketone bodies exists. Whatever the mechanism may be, we can now add total ketone bodies to the list of substances which are usually hypotonic in sweat as compared to serum. Others are total osmotic concentration, sodium, and chloride.

TABLE AIX.36

PRE-PERIOD DATA ON TOTAL KETONE BODIES: CONCENTRATION RATIO BETWEEN URINE AND SWEAT DURING EXERCISE
(Urine/Sweat Concentration Ratio; Summer 1955; Heat Acclimatization Test; PRE II)

Flight	N	Mean*	Range	s.d.	C.V.	Mean Temp. °F
1	21	7.9	2.4 - 17.0	2.0	25	93.8
2	17	6.0	1.7 - 15.5	3.8	64	94.8
3	19	21.7	2.6 - 56.5	11.5	53	95.1
4	21	5.9	0.4 - 22.9	4.6	78	94.6
FRA	11	13.1	2.0 - 32.4	9.7	74	----

* When all means were compared with each other by Fisher's "t" test, Flight 3 mean was significantly different from all other means, P 0.01. No other mean differences were significant at the 5% level.

TABLE AIX.37

TOTAL KETONE BODIES: URINE/SWEAT CONCENTRATION RATIO DURING EXERCISE

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Light Work PRE II	Light Work EXP I
ST 0	U	9.30	26.41	19.64	18.85
	L	3.39	29.96	9.34	24.23
0/100/0	U	8.22	11.03	26.25	3.86
1000	L	0.50	23.48	4.97	7.62
0/100/0	U	5.07	0.50	25.77	3.75
2000	L	2.08	4.03	8.44	1.26
2/20/78	U	6.62	13.90	40.00	2.69
1000	L	21.92	8.04	1.64	4.59
2/20/78	U	5.44	4.77	----	4.79
2000	L	6.89	4.58	4.12	10.07
15/52/33	U	3.80	6.72	9.80	1.20
1000	L	8.68	9.71	3.99	3.04
15/52/33	U	9.14	12.92	4.86	0.24
2000	L	3.93	4.31	9.13	2.71
15/52/33	U	8.36	5.12	21.20	3.44
3000	L	8.94	7.80	3.14	----
30/0/70	U	5.90	31.20	56.50	10.11
1000	L	2.64	18.47	6.01	8.31
30/0/70	U	5.96	5.57	2.10	1.17
2000	L	4.92	8.52	4.40	8.37
FRA	U	9.24	7.47	18.46	10.21
	L	8.77	20.48	14.34	6.71

6. Lactic Acid Concentration in Sweat

In spectacular contrast to its small excretion of ketone bodies is the sweat gland's secretion of lactate. In view of their somewhat similar structures (lactic acid, CH_3.CHOH. COOH; beta hydroxybutyric acid, CH_3.CHOH. CH_2. COOH), one might expect the two molecules to behave similarly. Quite the opposite is true. Lactate is quantitatively an important anion in sweat. A usual value is 25 mMol/L, about 30% of the total anions of sweat. It is very hypertonic in sweat as compared to serum, with a concentration ratio up to 30:1, and must be secreted actively, or else be produced in the sweat gland after the sweat has been formed in the coiled distal tubule. It is instructive to examine the urine/sweat concentration ratio with respect to lactate. Pre-period data, summarized in Table AIX.38, show a very much higher concentration in sweat than in urine, both collected simultaneously during exercise. The ratio is between 15:1 and 20:1 in normally hydrated, well fed subjects. During the experimental period, these very high ratios persisted regardless of work load, water intake, or other characteristics of the regimen (Table AIX.39).

This extraordinarily high ratio of sweat lactate to urine lactate is caused by a high concentration of sweat lactate (Table AIX.40) in contrast to a low concentration of urinary lactate (Table AIX.41).

TABLE AIX. 38

PRE-PERIOD DATA ON LACTATE: CONCENTRATION RATIO BETWEEN URINE AND SWEAT DURING EXERCISE (Urine/Sweat; Summer 1955; Heat Acclimatization Test; PRE II)

Flight	N	Mean*	Range	s.d.	C.V.
1	21	0.052	0.032 - 0.129	0.023	45
2	19	0.079	0.010 - 0.184	0.039	49
3	19	0.062	0.031 - 0.144	0.033	53
4	17	0.051	0.022 - 0.092	0.027	52
FRA	11	0.078	0.024 - 0.187	0.049	63

* When tested against each other by Fisher's "t" test, no group differences were significant at the 5% level.

TABLE AIX.39

TOTAL LACTATE: URINE/SWEAT CONCENTRATION RATIOS DURING EXERCISE (Summer 1955; PRE II and EXP I)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Light Work PRE II	Light Work EXP I
ST 0	U	0.048	0.049	0.043	0.060
	L	0.068	0.042	0.044	0.068
0/100/0	U	0.038	0.042	0.068	0.016
1000	L	0.102	0.052	0.070	0.083
0/100/0	U	0.070	0.003	0.062	0.137
2000	L	0.054	0.072	0.030	0.111
2/20/78	U	0.044	0.028	0.068	0.015
1000	L	0.152	0.035	0.036	0.132
2/20/78	U	0.040	0.014	0.144	0.061
2000	L	0.078	0.023	0.023	0.140
15/52/33	U	0.034	0.030	0.030	0.032
1000	L	0.074	0.038	0.036	0.108
15/52/33	U	0.082	0.038	0.038	0.006
2000	L	0.069	0.022	0.066	0.074
15/52/33	U	0.073	0.024	0.112	0.025
3000	L	0.037	0.024	0.042	-----
30/0/70	U	0.052	0.021	0.073	0.194
1000	L	0.062	0.047	0.060	0.164

TABLE AIX.39 (Contd)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Light Work PRE II	Light Work EXP I
30/0/70	U	0.032	0.010	0.056	0.022
2000	L	0.107	0.033	0.092	0.149
FRA	U	0.063	0.051	0.094	0.049
	L	0.054	0.084	0.092	0.042

TABLE AIX.40

TOTAL LACTATE: CONCENTRATION IN SWEAT DURING EXERCISE
(mEq/L; Heat Acclimatization Test; Summer 1955)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Light Work PRE II	Light Work EXP I
ST 0	U	22.3	20.6	20.6	16.7
	L	9.6	21.0	24.9	19.2
0/100/0	U	18.8	18.9	17.4	27.6
1000	L	11.1	18.4	23.3	19.7
0/100/0	U	11.6	23.5	25.4	18.9
2000	L	8.4	30.0	21.8	3.8
2/20/78	U	33.9	25.0	19.5	15.0
1000	L	6.5	19.2	27.2	6.0
2/20/78	U	29.2	32.5	14.2	14.0
2000	L	12.0	29.8	33.8	5.7
15/52/33	U	32.9	28.4	28.7	14.0
1000	L	9.8	22.3	30.8	13.0
15/52/33	U	15.2	24.0	22.1	31.6
2000	L	16.6	33.9	23.0	14.6
15/52/33	U	9.0	28.4	9.7	29.4
3000	L	32.2	24.4	22.4	----
30/0/70	U	20.1	14.6	18.7	3.5
1000	L	9.2	19.0	21.7	3.3
30/0/70	U	27.1	25.0	13.6	17.3
2000	L	8.4	20.2	24.9	4.7
FRA	U	14.0	14.5	12.9	18.5
	L	21.5	17.2	10.9	22.3

TABLE AIX.41

TOTAL LACTATE: CONCENTRATION IN URINE DURING EXERCISE
(mEq/L; Heat Acclimatization Test; Summer 1955)

Experimental Regimen		Hard Work PRE II	Hard Work EXP I	Light Work PRE II	Light Work EXP I
ST 0	U	1.06	1.02	0.87	0.90
	L	0.94	0.89	1.04	1.24
0/100/0	U	0.74	0.74	1.18	0.46
1000	L	0.76	1.62	1.70	1.32
0/100/0	U	0.80	0.08	1.08	0.75
2000	L	0.58	1.95	0.67	0.42
2/20/78	U	1.22	0.69	1.32	0.22
1000	L	0.94	0.65	0.62	0.80
2/20/78	U	1.16	0.42	2.05	0.86
2000	L	0.86	0.68	0.78	0.80
15/52/33	U	1.12	0.85	0.76	0.32
1000	L	0.73	0.85	1.12	1.06
15/52/33	U	0.98	0.88	0.92	0.20
2000	L	1.29	0.76	1.52	1.32
15/52/33	U	0.68	0.68	1.00	0.70
3000	L	1.19	0.56	0.94	----
30/0/70	U	1.45	0.38	1.10	0.68
1000	L	0.56	0.90	1.32	0.54
30/0/70	U	0.88	0.28	0.80	0.40
2000	L	0.90	0.59	1.73	0.70
FRA	U	0.76	0.75	1.04	0.87
	L	1.11	1.41	0.97	0.91

7. Discussion of Ketone Body Metabolism During Exercise in Moist Heat*

In seeking for a generalizing hypothesis to explain our results, it is necessary to consider the two major dietary conditions with which we dealt. In the pre-period, all subjects were adequately fed and fully hydrated. In the experimental period some subjects were subsisting on non-ketogenic diets, with or without limitation of water. Others were subsisting on ketogenic diets, with or without limitation of water. All except those on 3000 Calorie regimens, or on the control (FRA) diet, were in various degrees of calorie undernutrition. In the actual heat test, we were dealing with three physiological states in which ketone body metabolism might be expected to vary because of different physiological responses: rest before exercise; exercise; rest after exercise. It is generally considered that ketone bodies which appear in the blood and urine are manufactured in the liver under the influence of pituitary hormones

* For a discussion of some of the literature supporting this section, see Sargent and Consolazio (1950) and Sargent (1954).

(diabetogenic hormone, somatotrophic hormone). They are utilized at a constant rate (for any given state of fixed activity or rest) by the muscles. These considerations would hold for rest before exercise and exercise itself. However, the Courtice-Douglas effect (ketosis of constantly increasing severity after cessation of prolonged exercise) is not so readily explained by this simple picture, unless one assumes an "over-shooting." It could be that during prolonged exercise muscle utilization increases and liver production likewise, but to a slightly greater extent. Circulating diabetogenic hormone might accumulate. After exercise, if diabetogenic hormone is not swiftly destroyed in the body, muscular utilization would decrease, whereas liver production would continue at a rate higher than in rest before exercise. Ketone bodies would accumulate progressively, and there would be a progressively severe ketosis. These phenomena could all be similar in the subject whether well fed on a non-ketogenic diet, and well hydrated, or on a ketogenic diet. However, in the latter case another factor might supervene. The resting ketosis in a high fat regimen, accentuated by partial starvation, might be due to some mechanism more or less independent of the stimulus of diabetogenic hormone. Thus, in at least some subjects (Tables AIX.32, AIX.31, and AIX.7), the resting excretion might be very high. With the onset of prolonged exercise, muscular utilization might preponderate, and the urinary excretion during exercise become lower than at rest before exercise. Then with the cessation of exercise, diabetogenic hormonal stimulation of liver production of ketones might preponderate, and the urinary excretion begin to increase, not because of a dietary effect, but because of the post-exercise effect of Courtice and Douglas.

It is to be noted that it was our light work subjects on a ketogenic regimen (Table AIX.32) who showed a high percentage of cases in which work excretion was less than pre-work excretion. We might postulate that in the hard work subjects, daily muscular exercise of 12 miles marching utilized ketone bodies much more than was the case in light work subjects, both groups being on regimens of identical dietary ketogenicity. Hence, urinary excretion at rest before marching would be expected to be lower in hard work subjects than in light work subjects, and the effects of diabetogenic hormone during and after exercise would be more clearly distinct than in the light work groups. In the latter, the effect would be shown (as it was) by an increase in post-work excretion over work excretion, both tending to be smaller than in rest prior to exercise.

There still requires to be explained why glucose (or glucose precursors) in adequate amount will prevent dietary ketosis at rest caused by a ketogenic regimen and will also quickly abolish ketosis arising during rest after prolonged exercise. Increased blood sugar by itself is not necessarily antiketogenic; e.g., in diabetes mellitus, a very high concentration of glucose in the blood is frequently associated with ketosis. Only insulin in adequate amounts will prevent diabetic ketosis. As a matter of pure speculation, one might postulate that insulin can inhibit the ketogenic effect of diabetogenic hormone by competitive inhibition in the liver. Ingestion of glucose will stimulate production of insulin by the pancreas. In dietary ketosis or ketosis after exercise, this circulating insulin will then abolish the ketosis. However, there is always a small concentration of ketone bodies

to be measured in blood and urine. Hence, insulin does not entirely inhibit ketone body formation under any circumstances; it only reduces this formation to its normal rate.

8. Summary and Conclusions

1. Samples of urine were collected before, during, and after a one-hour march at 3.75 m.p.h. in moist heat. Samples of sweat were collected during the march. All samples of urine and sweat were analyzed for total ketone bodies (acetone plus acetoacetate plus beta hydroxybutyrate).

2. During pre-period (two weeks), all subjects were subsisting on a calorically adequate, well balanced regimen with unlimited water. During the experimental period (ten days) subjects were subsisting on various experimental regimens, some non-ketogenic, some ketogenic, some with unlimited and some with limited water. All experimental regimens (except the control regimen) were calorically inadequate.

3. During the pre-period, the rate of excretion of total ketone bodies in the urine was significantly higher in rest after exercise than in rest before exercise. This observation established the Courtice-Douglas effect (progressive increase of ketone body concentration in blood and urine after cessation of prolonged exercise) as a general phenomenon, even in non-ketogenic regimens.

4. During the experimental period and regardless of daily work load or water intake, in all non-ketogenic regimens (pure carbohydrate, normal diet), rate of excretion in exercise and in rest after exercise was greater than in rest before exercise. In ketogenic regimens (starvation; low protein-low carbohydrate-high fat; high protein-low carbohydrate-high fat) there was a difference in the behavior of hard work groups (12 miles walking per day) and light work groups (3 miles walking per day). In the former, rate of excretion of total ketone bodies regularly was greater in exercise and in rest after exercise than it was in rest before exercise. In the latter, rate of excretion at rest before exercise regularly was greater than during or after exercise. However, in these light work groups rate of excretion after exercise was greater than during exercise.

5. Concentration of total ketone bodies in sweat is very small and independent of serum concentration. Only at low serum concentrations does the sweat concentration approach that of serum. Even in non-ketogenic regimens urine/sweat concentration ratio is of the order of 10 to 1. By contrast, the concentration of lactate in sweat is far higher than that in urine; urine/sweat concentration ratios average about 1 to 20. The sweat gland therefore handles these two kinds of molecules in drastically different ways: it prevents ketone bodies entering sweat, but actively secretes lactate.

6. A speculative hypothesis is presented to correlate all these results as well as the Courtice-Douglas effect. Regardless of the dietary ketogenicity of a regimen, prolonged exercise is associated with the production of diabetogenic hormone, enhanced ketogenesis by the liver, and in-

creased utilization of ketone bodies by the muscles. Upon cessation of prolonged exercise, diabetogenic hormone persists in the body, the liver continues to produce ketone bodies at an accelerated rate (in comparison with rest before exercise) but the muscles cease to utilize it. Increased blood concentrations and urinary excretion ensue. In ketogenic regimens (starvation; high fat) ingestion of glucose will abolish the resting dietary ketosis as well as the post-exercise increase because glucose stimulates the production of insulin, which inhibits the action of diabetogenic hormone on the liver.

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D. TABLES OF ORIGINAL DATA

In the following pages the original data on ketone bodies for both 1954 winter study and 1955 summer studies. Tables AIX.42-AIX.61 deal with the winter study and Tables AIX.62-AIX.105 deal with the summer study. The format of the tables is similar to that used in Appendix II of the present report and WADC TR 53-484, Part 3, Volume I.

TABLE AIX.42

URINARY TOTAL KETONE BODY
CONCENTRATION (WINTER 1954): FLIGHT 1
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
1	1.30	75.48	---
2	2.36	10.80	2.97
3	0.79	9.70	1.32
4	0.62	22.65	11.55
5	1.22	9.03	1.45
6	1.53	8.70	2.24
7	1.06	5.72	0.96
8	1.24	3.16	4.07
9	6.30	56.19	11.70
10	1.64	4.14	3.51
11	3.11	5.62	4.05
12	6.98	31.32	20.78
13	2.53	18.17	15.46
14	2.12	6.70	3.88
15	1.06	3.33	2.25
16	1.72	18.72	2.61
17	0.84	10.40	4.50
18	5.37	10.00	2.85
19	1.21	1.19	1.30
20	1.32	3.90	1.11
21	1.40	0.91	2.62
22	1.24	0.60	1.00
90	1.10	4.62	4.00
91	1.46	2.51	2.09
92	4.76	3.26	3.35

TABLE AIX.43

URINARY TOTAL KETONE BODY
CONCENTRATION (WINTER 1954): FLIGHT 2
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
23	2.56	32.91	20.16
24	2.70	54.90	22.49
25	2.82	13.51	9.23
26	1.15	12.36	4.80
27	2.16	9.39	9.87
28	1.31	7.06	6.41
29	3.06	7.00	1.54

TABLE AIX.43 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
30	1.46	3.20	2.64
31	0.85	13.81	5.72
32	8.00	26.28	10.25
33	4.25	19.49	4.37
34	3.43	8.90	3.91
35	2.09	25.20	6.12
36	3.86	13.86	6.05
37	3.24	22.09	4.95
38	1.72	4.88	3.45
39	0.68	4.07	2.26
40	2.12	9.92	5.84
41	0.90	3.90	2.63
42	2.20	8.07	2.22
43	2.03	5.82	3.33
44	4.28	4.41	4.23
93	1.38	1.53	3.54
94	4.29	3.73	1.22
95	1.69	1.84	1.00
102	---	---	---

TABLE AIX.44

URINARY TOTAL KETONE BODY
CONCENTRATION (WINTER 1954): FLIGHT 3
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
45	3.12	29.16	1.80
46	2.59	92.28	6.84
47	1.07	27.45	---
48	0.41	1.50	1.00
49	1.05	9.87	2.31
50	0.80	5.87	0.43
51	0.33	7.76	1.28
52	3.52	2.56	5.31
53	2.05	22.23	25.64
54	1.72	14.17	18.27
55	0.47	6.75	5.30
56	0.87	2.79	2.88
57	1.72	45.30	20.92
58	0.75	9.10	8.71
59	0.67	8.08	3.69
60	1.57	11.43	---

TABLE AIX.44 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
61	0.72	13.75	1.76
62	1.06	6.85	1.43
63	1.91	7.11	1.11
64	0.92	7.97	2.77
65	0.87	4.24	1.81
66	2.08	5.76	4.80
96	0.96	4.90	1.52
97	9.84	3.83	1.79
98	4.05	2.66	1.60

TABLE AIX.45

URINARY TOTAL KETONE BODY
CONCENTRATION (WINTER 1954): FLIGHT 5
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
68	0.70	72.09	41.21
69	2.02	71.04	7.72
70	3.63	50.85	8.79
71	1.79	10.57	8.32
72	2.45	6.60	7.48
73	2.96	9.09	6.95
74	1.68	7.36	5.34
75	3.65	12.95	8.32
76	1.73	9.66	4.88
77	0.72	4.72	3.60
78	1.77	11.90	7.41
79	0.84	28.98	19.48
80	4.93	61.20	31.50
81	1.76	13.91	10.48
82	1.50	8.28	7.89
83	1.62	12.11	3.32
84	3.11	6.05	6.80
85	2.28	7.38	5.97
86	2.82	6.22	2.73
87	6.79	3.93	4.69
88	2.06	3.99	3.21
99	4.16	8.07	1.21
100	0.95	1.32	0.54
101	3.73	2.99	0.38

TABLE AIX.46

SERUM TOTAL KETONE BODY
CONCENTRATION (WINTER 1954): FLIGHT 1
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
1	1.52	7.08	---
2	0.83	2.73	1.23
3	0.71	3.39	3.78
4	0.64	5.64	7.68
5	0.75	1.47	0.83
6	0.71	1.66	0.64
7	0.59	0.65	0.73
8	0.67	0.96	0.35
9	1.54	8.82	6.90
10	1.11	4.41	3.54
11	0.61	3.12	2.70
12	1.30	4.35	4.56
13	0.73	3.93	3.72
14	1.15	2.49	2.37
15	0.71	3.00	1.32
16	0.62	2.34	2.16
17	0.44	1.30	1.25
18	0.86	1.19	1.01
19	0.58	1.18	0.94
20	1.11	1.32	1.18
21	0.98	1.19	2.24
22	0.95	1.07	0.90
90	0.68	0.74	0.56
91	0.54	0.70	0.76
92	0.65	0.78	0.60

TABLE AIX.47

SERUM TOTAL KETONE BODY
CONCENTRATION (WINTER 1954): FLIGHT 2
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
23	0.44	5.46	2.16
24	0.51	5.34	4.08
25	0.25	1.50	1.80
26	0.65	3.66	2.10
27	0.65	1.47	0.77
28	0.75	---	0.89
29	0.56	0.75	0.56

TABLE AIX.47 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
30	0.46	1.24	0.53
31	0.59	4.02	3.03
32	0.72	2.88	2.37
33	0.91	4.14	2.10
34	0.71	1.95	1.59
35	0.44	3.08	2.10
36	0.71	2.40	1.23
37	0.37	1.71	0.90
38	0.93	2.04	2.37
39	0.37	1.35	0.83
40	0.42	1.11	0.73
41	0.47	0.68	0.61
42	0.73	1.45	0.71
43	0.71	0.57	0.47
44	0.50	0.56	0.58
93	0.73	0.66	0.96
94	0.55	0.62	0.40
95	0.66	0.68	0.54

TABLE AIX.48

SERUM TOTAL KETONE BODY
CONCENTRATION (WINTER 1954): FLIGHT 3
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
45	0.70	6.12	4.62
46	0.64	6.78	3.99
47	0.45	1.62	---
48	0.51	1.10	0.21
49	0.44	0.74	0.69
50	0.43	0.95	0.67
51	0.56	0.65	0.55
52	0.88	0.59	0.49
53	0.64	3.96	5.04
54	0.87	3.48	4.23
55	0.83	2.67	2.10
56	0.52	2.52	2.82
57	0.77	3.54	3.00
58	0.61	4.44	3.54
59	0.50	2.49	1.80
60	0.53	1.44	---
61	1.00	2.22	1.71

TABLE AIX.48 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
62	0.65	1.31	0.96
63	0.30	1.00	1.17
64	0.49	1.26	0.74
65	0.45	1.03	0.62
66	1.04	0.80	0.60
96	0.88	0.52	0.58
97	1.56	1.17	0.64
98	1.04	0.79	0.64

TABLE AIX.49

SERUM TOTAL KETONE BODY
CONCENTRATION (WINTER 1954): FLIGHT 4
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
68	0.83	6.72	2.28
69	0.78	5.46	1.17
70	0.72	7.20	1.84
71	0.68	0.80	1.14
72	1.56	1.08	0.70
73	0.92	0.40	0.50
74	1.07	0.60	0.50
75	0.92	2.40	2.31
76	1.01	2.52	2.22
77	0.92	2.04	1.95
78	0.92	2.84	1.83
79	0.78	5.22	4.38
80	0.78	2.97	3.33
81	0.87	1.86	1.38
82	0.68	1.68	0.93
83	1.18	1.22	1.62
84	0.80	1.10	1.17
85	1.34	1.22	0.87
86	0.90	0.58	0.56
87	0.68	0.56	0.42
88	1.22	0.66	0.69
99	1.26	1.55	0.94
100	1.56	1.23	1.19
101	1.47	0.89	0.64

TABLE AIX.50

URINE/SERUM RATIO FOR TOTAL KETONE BODIES (WINTER 1954): FLIGHT 1

Subject Code No.	PRE II	EXP I	EXP II
1	0.86	10.66	---
2	2.84	3.96	2.41
3	1.11	2.86	1.35
4	0.97	4.02	1.50
5	1.63	6.14	1.75
6	2.16	5.24	3.50
7	1.80	8.80	1.32
8	1.85	3.29	11.63
9	4.09	6.37	1.70
10	1.48	0.94	0.99
11	5.10	1.80	1.50
12	5.37	7.20	4.56
13	3.47	4.62	4.16
14	1.84	2.69	1.64
15	1.49	1.11	1.70
16	2.78	8.00	1.21
17	1.91	8.00	3.60
18	6.24	8.40	2.82
19	2.09	1.01	1.38
20	1.19	2.95	0.94
21	1.43	0.76	1.17
22	1.30	0.56	1.11
90	1.62	6.24	7.14
91	2.70	3.59	2.75
92	7.32	4.18	5.58

TABLE AIX.51

URINE/SERUM RATIO FOR TOTAL KETONE BODIES (WINTER 1954): FLIGHT 2

Subject Code No.	PRE II	EXP I	EXP II
23	5.82	6.03	9.33
24	5.29	10.28	5.51
25	11.28	9.01	5.13
26	1.77	3.38	2.29
27	3.32	6.39	12.82
28	1.75	---	7.20
29	5.46	9.33	2.75
30	3.17	2.58	4.98

TABLE AIX.51 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
31	1.44	3.43	1.89
32	11.11	9.12	4.33
33	4.67	4.71	2.08
34	4.83	4.56	2.46
35	4.75	8.18	2.91
36	5.44	5.77	4.92
37	8.76	12.92	5.50
38	1.85	2.39	1.46
39	1.84	3.01	2.72
40	5.05	8.93	8.00
41	1.91	5.74	4.31
42	3.01	5.57	3.13
43	2.86	10.21	7.09
44	8.56	7.88	7.29
93	1.89	2.32	3.69
94	7.80	6.02	3.05
95	2.56	2.71	1.85

TABLE AIX.52

URINE/SERUM RATIO FOR TOTAL KETONE BODIES (WINTER 1954): FLIGHT 3

Subject Code No.	PRE II	EXP I	EXP II
45	4.46	4.76	0.39
46	4.05	13.61	1.71
47	2.38	16.94	---
48	0.80	1.36	4.76
49	2.39	13.34	3.35
50	1.86	6.18	0.64
51	0.59	11.94	2.33
52	4.00	4.34	10.84
53	3.20	5.61	5.09
54	1.98	4.07	4.32
55	0.57	2.53	2.52
56	1.67	1.11	1.02
57	2.23	12.80	6.97
58	1.23	2.05	2.46
59	1.34	3.24	2.05
60	2.96	7.94	---
61	0.72	6.19	1.03
62	1.63	5.23	1.49
63	6.37	7.11	0.95
64	1.88	6.33	3.74

TABLE AIX.52 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
65	1.93	4.12	2.92
66	2.00	7.20	8.00
96	1.09	9.42	2.62
97	6.31	3.27	2.80
98	3.89	3.37	2.50

TABLE AIX.53

URINE/SERUM RATIO FOR TOTAL KETONE BODIES (WINTER 1954): FLIGHT 4

Subject Code No.	PRE II	EXP I	EXP II
68	0.84	10.73	18.07
69	2.59	13.01	6.60
70	5.04	7.06	4.78
71	2.63	13.21	7.30
72	1.57	6.11	10.69
73	3.22	22.72	13.90
74	1.57	12.27	10.68
75	3.97	5.40	3.60
76	1.71	3.83	2.20
77	0.78	2.31	1.85
78	1.92	4.19	4.05
79	1.08	5.55	4.45
80	6.32	20.60	9.46
81	2.02	7.48	7.59
82	2.21	4.93	8.48
83	1.37	9.93	2.05
84	3.89	5.50	5.81
85	1.70	6.05	6.86
86	3.13	10.72	4.88
87	9.99	7.02	11.17
88	1.69	6.05	4.65
99	3.30	5.21	1.29
100	0.61	1.07	0.45
101	2.54	3.36	0.59

TABLE AIX.54

MINUTE URINARY TOTAL KETONE BODY EXCRETION (WINTER 1954): FLIGHT 1 (μMol/min)

Subject Code No.	PRE II	EXP I	EXP II
1	1.51	51.36	---
2	3.30	7.65	1.67
3	1.06	4.96	2.79
4	1.36	13.31	5.17
5	2.49	3.55	0.61
6	1.14	2.53	0.49
7	1.46	2.40	0.89
8	0.70	1.45	1.14
9	3.97	88.70	22.58
10	6.30	16.19	8.60
11	2.45	6.23	4.10
12	8.15	58.26	15.54
13	2.86	28.03	7.89
14	2.94	8.13	4.01
15	1.97	6.19	2.74
16	1.48	10.67	9.71
17	1.56	3.64	1.58
18	1.29	3.11	1.68
19	1.25	4.32	2.69
20	1.66	4.45	3.49
21	1.79	2.89	1.86
22	1.44	2.89	3.43
90	1.81	3.70	3.44
91	2.62	2.14	2.19
92	3.42	2.71	2.45

TABLE AIX.55

MINUTE URINARY TOTAL KETONE BODY EXCRETION (WINTER 1954): FLIGHT 2 (μMol/min)

Subject Code No.	PRE II	EXP I	EXP II
23	6.55	16.89	9.48
24	2.00	19.76	6.74
25	6.13	4.46	3.42
26	1.90	7.43	2.59
27	5.37	3.29	3.06
28	3.98	3.12	2.38
29	1.19	0.56	0.62
30	2.41	0.90	0.61

TABLE AIX.55 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
31	1.65	8.82	3.44
32	5.29	22.60	8.60
33	2.93	14.57	4.42
34	2.78	7.13	3.24
35	2.13	8.82	2.64
36	3.98	3.60	1.82
37	3.05	11.76	3.37
38	2.05	4.94	3.41
39	0.66	1.96	1.14
40	2.21	4.76	2.51
41	2.11	4.17	2.07
42	3.46	4.77	1.29
43	1.32	4.83	2.10
44	2.70	4.41	3.18
93	3.67	3.47	3.19
94	1.85	2.24	2.73
95	3.10	3.40	3.09

TABLE AIX.56

MINUTE URINARY TOTAL KETONE BODY EXCRETION (WINTER 1954): FLIGHT 3 (μMol/min)

Subject Code No.	PRE II	EXP I	EXP II
45	2.68	69.40	7.65
46	1.94	57.37	5.83
47	1.96	7.90	---
48	1.28	2.62	1.20
49	1.22	2.47	1.98
50	1.37	4.16	0.27
51	0.80	2.83	0.88
52	2.64	2.64	2.93
53	1.84	25.46	24.81
54	1.91	18.27	18.80
55	1.34	18.09	6.77
56	1.74	8.37	7.08
57	3.99	28.04	32.29
58	1.30	22.44	12.31
59	4.11	7.43	6.31
60	3.33	19.89	---
61	3.32	12.60	4.40
62	1.51	3.91	2.67

TABLE AIX.56 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
63	2.98	5.20	2.99
64	3.30	6.84	3.03
65	1.69	3.47	2.30
66	6.53	4.09	3.26
96	1.20	2.40	6.12
97	4.92	2.95	2.89
98	3.20	3.28	3.58

TABLE AIX.57

MINUTE URINARY TOTAL KETONE BODY EXCRETION (WINTER 1954): FLIGHT 4 (μMol/min)

Subject Code No.	PRE II	EXP I	EXP II
68	1.55	44.82	21.03
69	2.02	41.23	6.05
70	1.82	17.29	3.17
71	1.04	3.60	2.33
72	2.25	2.18	1.86
73	3.45	2.28	2.50
74	3.34	1.62	1.97
75	2.05	6.20	4.64
76	0.94	6.38	2.59
77	1.16	5.90	3.42
78	2.32	10.88	7.13
79	1.81	16.50	10.51
80	2.66	26.93	20.16
81	1.76	6.68	5.24
82	3.86	3.97	4.89
83	3.27	3.75	4.31
84	1.97	1.81	2.31
85	1.09	3.92	3.05
86	3.18	4.28	1.37
87	5.43	3.23	3.28
88	4.49	2.83	1.92
99	3.25	3.96	3.70
100	6.13	3.99	2.37
101	2.08	3.03	1.58

TABLE AIX.58

TOTAL KETONE BODY CLEARANCE (WINTER 1954): FLIGHT 1
(ml/min)

Subject Code No.	PRE II	EXP I	EXP II
1	0.99	7.25	---
2	3.98	2.80	1.36
3	1.49	1.46	0.74
4	2.12	2.36	0.67
5	3.32	2.41	0.73
6	1.61	1.52	0.77
7	2.47	3.69	1.22
8	1.04	1.51	3.26
9	2.58	10.05	3.27
10	5.68	3.67	2.43
11	4.01	2.00	1.52
12	6.27	13.39	3.41
13	3.92	7.13	2.12
14	2.56	3.26	1.69
15	2.78	2.06	2.08
16	2.39	4.56	4.50
17	3.55	2.80	1.26
18	1.50	2.61	1.66
19	2.16	3.66	2.86
20	1.50	3.37	2.96
21	1.83	2.43	0.83
22	1.52	2.70	3.81
90	2.66	5.00	6.14
91	4.85	3.06	2.88
92	5.26	3.47	4.08

TABLE AIX.59

TOTAL KETONE BODY CLEARANCE (WINTER 1954): FLIGHT 2
(ml/min)

Subject Code No.	PRE II	EXP I	EXP II
23	14.89	3.09	4.39
24	3.92	3.70	1.65
25	24.52	2.97	1.90
26	2.92	2.03	1.23
27	8.57	2.24	3.97
28	5.31	---	2.67
29	2.12	0.75	1.11
30	5.24	0.73	1.15

TABLE AIX.59 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
31	2.80	2.19	1.14
32	7.35	7.85	3.63
33	3.22	3.52	2.10
34	3.92	3.66	2.04
35	4.84	2.86	1.26
36	5.61	1.50	1.48
37	8.24	6.88	3.74
38	2.20	2.42	1.44
39	1.78	1.45	1.37
40	5.26	4.29	3.44
41	4.49	6.13	3.39
42	4.74	3.29	1.82
43	1.86	8.47	4.47
44	5.40	7.88	5.48
93	5.03	5.26	3.32
94	3.36	3.61	6.82
95	4.70	5.00	5.72

TABLE AIX.60

TOTAL KETONE BODY CLEARANCE (WINTER 1954): FLIGHT 3
(ml/min)

Subject Code No.	PRE II	EXP I	EXP II
45	3.83	11.34	1.66
46	3.03	8.46	1.46
47	4.36	4.88	---
48	2.51	2.38	5.71
49	2.77	3.34	2.87
50	3.19	4.38	0.40
51	1.43	4.35	1.60
52	3.00	4.47	5.98
53	2.88	6.43	4.92
54	2.20	5.25	4.44
55	1.61	6.78	3.22
56	3.35	3.32	2.51
57	5.18	7.92	10.76
58	2.13	5.05	3.48
59	8.22	2.98	3.51
60	6.28	13.81	---
61	3.32	5.68	2.57

TABLE AIX.60 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
62	2.33	2.98	4.31
63	9.93	5.20	2.56
64	6.73	5.43	4.09
65	3.76	3.37	3.71
66	6.28	5.11	5.43
96	1.36	4.62	10.55
97	3.15	2.52	4.52
98	3.08	4.15	5.59

TABLE AIX.61

TOTAL KETONE BODY CLEARANCE (WINTER 1954): FLIGHT 4
(ml/min)

Subject Code No.	PRE II	EXP I	EXP II
68	1.87	6.67	9.22
69	2.59	7.55	5.17
70	2.53	2.40	1.72
71	1.53	4.00	2.04
72	1.44	2.02	2.66
73	3.75	5.70	5.00
74	3.12	2.70	3.94
75	2.16	2.58	2.01
76	0.93	2.53	1.17
77	1.26	2.89	1.75
78	2.52	3.83	3.90
79	2.32	3.16	2.40
80	3.41	9.07	6.05
81	2.02	3.59	3.80
82	5.68	2.36	5.26
83	2.77	3.07	2.66
84	2.46	1.64	1.97
85	0.81	3.21	3.51
86	3.53	7.38	2.45
87	7.99	5.77	7.81
88	3.68	4.29	2.78
99	2.58	2.55	3.94
100	3.93	3.24	1.99
101	1.41	3.40	2.47

TABLE AIX.62

RESTING URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 1 (mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
1	0.56	15.80	21.00
2	1.37	---	---
3	0.35	7.10	---
4	0.86	8.98	3.64
5	0.28	1.00	---
6	0.47	0.82	4.67
7	0.23	0.30	3.60
8	0.52	0.90	1.50
9	0.71	11.71	15.95
10	0.69	6.20	6.32
11	0.13	1.88	2.07
12	0.39	5.49	7.01
13	0.56	23.18	---
14	0.34	3.69	2.92
15	0.42	4.38	1.74
16	0.17	2.56	---
17	---	2.23	6.73
18	0.24	1.47	1.49
19	0.22	0.82	1.50
20	0.20	0.47	---
21	0.43	1.00	0.60
22	0.18	0.23	0.87
90	0.56	0.77	0.80
91	0.37	0.32	0.31
92	0.36	0.40	0.40

TABLE AIX.63

RESTING URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 2 (mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
23	1.47	8.51	3.60
24	0.68	7.32	1.16
25	2.94	6.37	15.43
26	0.63	4.59	6.94
27	1.39	3.32	0.96
28	0.82	2.56	4.80
29	0.95	1.75	---

TABLE AIX.63 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
30	1.19	1.95	2.64
31	1.02	2.13	---
32	0.45	4.20	5.16
33	0.99	1.38	2.45
34	0.84	2.94	5.86
35	1.08	5.46	2.08
36	1.89	7.54	0.44
37	1.14	2.49	2.61
38	0.97	1.75	2.47
39	1.93	1.89	---
40	---	---	---
41	1.71	---	---
42	0.84	2.95	1.17
43	1.22	0.71	0.88
44	0.76	2.09	0.51
93	---	---	---
94	1.19	0.12	0.27
95	0.60	1.07	0.44
102	---	---	0.40

TABLE AIX.64

RESTING URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 3 (mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
45	0.69	18.00	4.54
46	0.86	3.62	3.26
47	0.47	63.70	10.72
48	0.22	76.30	13.08
49	1.19	0.72	0.71
50	0.86	1.04	0.91
51	0.88	0.73	0.59
52	0.72	0.70	5.35
53	1.09	13.12	6.51
54	0.99	5.44	3.41
55	0.31	3.58	3.95
56	1.00	2.72	0.83
57	1.02	2.88	1.69
58	1.14	---	0.38
59	0.80	1.96	0.68
60	2.30	2.05	2.78
61	0.62	2.36	1.08

TABLE AIX.64 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
62	0.79	1.95	1.50
63	0.57	1.20	0.90
64	0.29	2.24	1.21
65	2.17	1.69	1.35
66	0.76	0.27	1.54
96	1.51	0.14	0.95
97	0.87	0.55	0.96
98	0.22	0.71	0.40

TABLE AIX.65

RESTING URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 4 (mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
67	0.54	136.90	45.28
68	1.32	28.90	7.89
69	0.86	36.70	4.11
70	0.63	43.60	---
71	0.84	4.42	0.54
72	1.10	---	1.72
73	0.78	1.21	0.19
74	3.27	1.53	0.64
75	2.44	18.53	5.14
76	1.09	23.75	10.03
77	1.27	---	---
78	0.85	2.55	1.08
79	0.50	32.33	7.48
80	0.40	24.48	3.06
81	0.84	2.67	0.60
82	1.80	25.20	---
83	0.40	6.00	4.04
84	1.00	1.99	2.79
85	3.07	1.85	1.86
86	0.92	0.72	1.50
87	0.98	---	---
88	1.04	---	---
99	1.76	1.18	0.90
100	1.06	0.58	0.48
101	0.68	0.47	0.31

TABLE AIX.66

SERUM TOTAL KETONE BODY CONCENTRATION: FLIGHT 1
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
1	0.33	2.12	1.56
2	0.26	0.99	---
3	0.31	1.56	0.44
4	0.55	1.26	0.44
5	0.59	0.51	---
6	0.49	0.56	0.52
7	0.71	0.34	0.51
8	0.41	0.51	0.53
9	0.51	0.87	1.53
10	0.56	18.90	3.75
11	0.41	0.66	1.08
12	0.39	1.02	2.85
13	0.31	0.84	---
14	0.56	0.66	2.58
15	0.38	0.75	0.84
16	0.84	0.45	---
17	---	0.85	0.67
18	0.63	0.49	0.67
19	0.63	0.38	0.67
20	0.63	0.39	---
21	0.42	0.60	0.72
22	0.37	0.48	0.74
90	0.78	0.52	1.06
91	0.58	0.50	0.53
92	0.64	0.35	0.45

TABLE AIX. 67

SERUM TOTAL KETONE BODY CONCENTRATION: FLIGHT 2
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
23	0.62	5.10	2.16
24	0.60	3.78	1.89
25	1.03	3.75	1.92
26	0.52	4.26	1.56
27	0.46	0.74	0.31
28	0.53	0.72	0.40
29	0.84	0.34	0.56
30	0.73	0.50	0.42
31	0.70	3.24	1.98

TABLE AIX.67 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
32	0.73	3.24	0.90
33	0.54	1.95	1.38
34	0.68	1.77	0.81
35	0.65	2.07	0.90
36	0.45	2.58	0.48
37	0.75	2.16	0.63
38	0.63	2.22	0.54
39	0.47	0.82	0.24
40	---	---	0.49
41	0.69	---	---
42	0.59	0.67	0.66
43	0.59	0.43	0.44
44	0.42	0.46	0.49
93	---	---	---
94	0.51	0.58	0.54
95	0.89	0.80	1.02
102	---	---	0.60

TABLE AIX.68

SERUM TOTAL KETONE BODY CONCENTRATION: FLIGHT 3
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
45	0.40	1.83	4.32
46	0.52	2.07	1.86
47	0.49	2.07	8.40
48	0.60	2.02	5.80
49	0.61	1.07	0.90
50	0.46	0.77	0.50
51	0.44	0.50	0.34
52	0.72	1.03	0.54
53	0.82	2.46	1.50
54	0.70	1.38	0.96
55	0.46	0.72	0.72
56	0.86	0.69	0.54
57	0.78	1.14	1.23
58	1.37	---	1.38
59	0.68	1.05	0.48
60	0.69	0.57	0.54
61	0.74	0.75	0.81
62	0.57	0.66	0.53
63	1.03	0.66	0.50
64	0.98	0.50	0.58

TABLE AIX.68 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
65	0.58	0.41	0.48
66	0.91	0.46	0.78
96	0.58	0.37	0.76
97	0.59	0.71	0.68
98	0.87	0.66	0.54

TABLE AIX. 69

SERUM TOTAL KETONE BODY CONCENTRATION: FLIGHT 4
(mMol/L)

Subject Code No.	PRE II	EXP I	EXP II
67	0.90	4.44	5.00
68	0.52	1.59	0.78
69	0.73	2.10	5.04
70	0.52	1.83	---
71	0.99	0.33	0.52
72	1.04	0.30	0.68
73	0.65	0.25	0.42
74	1.10	0.41	0.25
75	0.76	1.20	0.81
76	1.05	1.65	1.11
77	0.51	0.75	---
78	0.72	0.48	0.81
79	0.77	0.99	2.85
80	0.82	0.27	1.32
81	0.68	0.45	0.63
82	0.74	0.87	---
83	0.59	0.65	0.68
84	0.45	0.73	0.63
85	0.89	0.55	0.79
86	1.00	0.79	0.72
87	0.51	0.70	---
88	0.47	---	---
99	0.50	0.68	0.90
100	1.01	0.68	0.94
101	0.55	0.53	0.89

TABLE AIX.70

URINE/SERUM RATIO FOR TOTAL KETONE BODIES (SUMMER 1955): FLIGHT 1

Subject Code No.	PRE II	EXP I	EXP II
1	1.70	7.45	13.46
2	5.27	---	---
3	1.13	4.55	5.45
4	1.56	7.13	8.27
5	0.47	1.96	---
6	0.96	1.46	8.98
7	0.32	0.88	7.06
8	1.27	1.76	2.83
9	1.39	13.46	10.42
10	1.23	6.26	1.69
11	0.32	2.85	1.92
12	1.00	5.38	2.46
13	1.81	27.60	---
14	0.61	5.59	1.13
15	1.11	5.84	2.07
16	0.20	5.69	---
17	---	2.62	10.04
18	0.38	3.00	2.22
19	0.35	2.16	2.24
20	0.32	1.20	---
21	1.02	1.67	0.83
22	0.49	0.48	1.18
90	0.72	1.48	0.75
91	0.64	0.64	0.58
92	0.56	1.14	0.89

TABLE AIX. 71

URINE/SERUM RATIO FOR TOTAL KETONE BODIES (SUMMER 1955): FLIGHT 2

Subject Code No.	PRE II	EXP I	EXP II
23	2.37	1.67	1.67
24	1.13	1.94	0.61
25	2.85	1.70	8.04
26	1.21	1.08	4.45
27	3.02	4.49	3.10
28	1.55	3.56	12.00
29	1.13	5.15	---
30	1.63	3.90	6.29
31	1.46	0.66	0.37

TABLE AIX.71 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
32	0.62	1.30	5.73
33	1.84	0.71	1.78
34	1.24	1.66	7.23
35	1.66	2.64	2.31
36	4.20	2.92	0.92
37	1.52	1.15	4.14
38	1.54	0.79	4.57
39	4.11	2.30	2.92
40	---	---	2.16
41	2.45	---	---
42	1.42	4.40	1.77
43	2.07	1.65	2.00
44	1.81	4.54	1.04
93	---	---	---
94	2.33	0.21	0.50
95	0.67	1.34	0.43
102	---	---	0.67

TABLE AIX.72

URINE/SERUM RATIO FOR TOTAL KETONE BODIES (SUMMER 1955): FLIGHT 3

Subject Code No.	PRE II	EXP I	EXP II
45	1.72	9.84	1.05
46	1.65	1.75	1.75
47	0.96	30.77	1.28
48	0.37	37.77	2.26
49	1.95	0.67	0.79
50	1.87	1.35	1.82
51	2.00	1.46	1.74
52	1.00	0.68	9.91
53	1.33	5.33	4.34
54	1.41	3.94	3.55
55	0.67	4.97	5.49
56	1.16	3.94	1.54
57	1.31	2.53	1.37
58	0.83	---	0.28
59	1.18	1.87	1.42
60	3.33	3.60	5.15
61	0.84	3.15	1.33
62	1.39	2.95	2.83
63	0.55	1.82	1.80
64	0.30	4.48	2.09

TABLE AIX.72 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
65	3.74	4.12	2.81
66	0.84	0.59	1.97
96	2.60	0.38	1.25
97	1.47	0.77	1.41
98	0.25	1.08	0.74

TABLE AIX.73

URINE/SERUM RATIO FOR TOTAL KETONE BODIES (SUMMER 1955): FLIGHT 4

Subject Code No.	PRE II	EXP I	EXP II
67	0.60	30.83	9.06
68	2.54	18.18	10.12
69	1.18	17.48	0.82
70	1.21	23.82	---
71	0.85	13.39	1.04
72	1.06	---	2.53
73	1.20	4.84	0.45
74	2.97	3.73	2.56
75	3.21	15.44	6.34
76	1.04	14.39	9.04
77	2.49	---	---
78	1.18	5.31	1.33
79	0.65	32.66	2.62
80	0.49	90.67	2.32
81	1.24	5.93	0.95
82	2.43	28.97	---
83	0.68	9.23	5.94
84	2.22	2.73	4.43
85	3.45	3.36	2.35
86	0.92	0.91	2.08
87	1.92	---	---
88	2.21	---	---
99	3.52	1.74	1.00
100	1.05	0.85	0.51
101	1.24	0.89	0.35

TABLE AIX.74

EXERCISE URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 1 (mMol/L)

Subject Code No.	PRE II	EXP I
1	5.28	22.50
2	5.04	---
3	2.55	16.68
4	5.34	18.48
5	1.89	0.93
6	1.80	6.60
7	1.32	0.36
8	1.32	0.10
9	1.89	17.16
10	2.28	---
11	2.64	5.58
12	2.61	0.90
13	5.34	18.24
14	3.57	6.54
15	1.71	7.68
16	5.10	0.48
17	---	6.78
18	2.28	1.71
19	2.46	3.09
20	5.10	7.08
21	1.92	1.68
22	4.74	4.68
90	5.28	3.63
91	1.56	3.08
92	1.02	0.86

TABLE AIX.75

EXERCISE URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 2

Subject Code No.	PRE II	EXP I
23	6.36	27.72
24	1.62	3.30
25	4.62	26.16
26	1.65	25.92
27	0.60	9.00
28	1.95	8.52
29	0.81	4.14
30	1.65	0.40

TABLE AIX.75 (Contd)

Subject Code No.	PRE II	EXP I
31	0.93	---
32	1.68	10.53
33	1.71	3.06
34	2.25	8.16
35	2.10	4.20
36	6.00	3.21
37	1.80	3.93
38	3.45	2.61
39	1.65	4.08
40	---	---
41	4.68	---
42	4.80	4.53
43	5.10	3.93
44	4.65	5.22
93	---	---
94	0.63	4.20
95	7.32	18.15
102	---	---

TABLE AIX.76

EXERCISE URINARY TOTAL KETONE BODY
CONCENTRATION (SUMMER 1955): FLIGHT 3

Subject Code No.	PRE II	EXP I
45	4.68	15.48
46	2.52	3.99
47	2.73	5.76
48	3.90	29.04
49	4.68	3.00
50	6.36	2.97
51	3.03	3.00
52	6.84	0.99
53	6.78	1.47
54	3.84	7.44
55	5.82	5.64
56	1.80	0.33
57	7.20	1.05
58	---	---
59	---	---
60	13.14	2.01
61	1.32	2.61
62	3.39	0.78
63	6.06	0.36

TABLE AIX.76 (Contd)

Subject Code No.	PRE II	EXP I
64	0.96	0.32
65	6.12	3.63
66	5.04	1.68
96	3.78	2.76
97	7.14	1.98
98	3.90	2.19

TABLE AIX.77

EXERCISE URINARY TOTAL KETONE BODY
CONCENTRATION (SUMMER 1955): FLIGHT 4

Subject Code No.	PRE II	EXP I
67	2.73	30.48
68	6.42	24.12
69	1.95	---
70	6.42	27.30
71	2.49	8.28
72	2.01	6.00
73	4.59	0.93
74	3.75	3.69
75	2.73	10.44
76	4.47	9.90
77	---	2.58
78	1.89	10.80
79	0.63	2.52
80	2.13	3.90
81	3.96	18.24
82	5.94	7.14
83	5.40	5.16
84	4.92	3.87
85	4.08	---
86	4.65	4.56
87	1.53	---
88	1.74	---
99	9.06	6.84
100	3.21	0.90
101	2.79	2.46

TABLE AIX.78

POST-EXERCISE URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 1 (mMol/L)

Subject Code No.	PRE II	EXP I
1	3.75	24.57
2	3.00	---
3	0.72	23.94
4	2.43	26.40
5	6.84	1.74
6	2.91	13.20
7	1.74	3.96
8	1.71	9.30
9	5.22	23.10
10	2.25	18.90
11	2.91	7.92
12	4.32	14.52
13	5.40	21.96
14	3.42	10.53
15	1.95	9.12
16	1.68	2.28
17	---	6.60
18	4.56	4.47
19	1.59	6.53
20	2.55	6.36
21	2.97	3.15
22	3.54	5.46
90	2.91	2.13
91	4.62	1.74
92	1.17	0.78

TABLE AIX.79

POST-EXERCISE URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 2

Subject Code No.	PRE II	EXP I
23	4.98	27.72
24	1.56	14.16
25	1.20	27.93
26	1.26	27.93
27	2.55	10.53
28	1.29	7.26
29	3.27	5.34
30	1.29	8.22

TABLE AIX.79 (Contd)

Subject Code No.	PRE II	EXP I
31	1.08	10.44
32	1.22	16.44
33	1.74	4.47
34	2.43	14.64
35	1.80	9.82
36	2.01	10.17
37	1.20	6.54
38	2.49	5.94
39	1.26	6.72
40	---	---
41	2.79	---
42	3.36	3.60
43	3.00	3.90
44	2.70	3.93
93	---	---
94	2.19	2.10
95	8.10	12.33
102	---	---

TABLE AIX.80

POST-EXERCISE URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 3

Subject Code No.	PRE II	EXP I
45	3.60	28.34
46	4.14	23.10
47	1.80	31.20
48	6.84	31.05
49	3.75	9.30
50	6.24	3.63
51	8.34	8.34
52	6.00	8.94
53	6.26	26.88
54	2.31	22.89
55	4.56	6.48
56	6.54	0.93
57	5.76	6.18
58	---	---
59	---	8.52
60	10.44	7.44
61	1.80	6.30
62	4.20	0.84
63	7.20	1.17

TABLE AIX.80 (Contd)

Subject Code No.	PRE II	EXP I
64	0.87	0.39
65	5.88	5.52
66	4.32	2.91
96	3.09	2.13
97	4.83	1.92
98	3.18	1.80

TABLE AIX.81

POST-EXERCISE URINARY TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 4

Subject Code No.	PRE II	EXP I
67	1.74	31.05
68	5.28	28.80
69	2.19	23.73
70	4.38	29.43
71	2.73	11.25
72	1.47	7.26
73	2.80	7.14
74	4.86	5.76
75	4.08	9.30
76	4.98	11.88
77	6.48	----
78	3.06	2.91
79	0.84	20.70
80	4.32	5.40
81	3.00	5.22
82	4.41	20.10
83	3.66	11.52
84	3.66	4.92
85	2.30	3.42
86	3.54	3.81
87	5.94	----
88	2.61	----
99	6.60	5.28
100	2.25	2.25
101	1.92	2.76

TABLE AIX.82

SWEAT TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 1
(mMol/L)

Subject Code No.	P I	P II	EXP I	REC I	REC II
1	0.12	0.31	1.47	0.25	0.40
2	0.82	0.34	---	---	0.28
3	0.66	0.33	0.52	0.37	0.45
4	0.20	0.41	0.58	0.37	0.19
5	0.80	0.24	0.22	---	0.14
6	0.71	0.21	0.37	0.25	0.34
7	0.91	0.30	0.51	0.29	0.34
8	0.43	0.23	0.34	0.28	0.22
9	0.40	0.31	0.55	0.29	0.32
10	0.69	0.40	0.70	0.45	0.50
11	0.67	0.44	0.61	0.28	1.08
12	1.45	0.44	0.45	0.39	0.98
13	---	0.64	0.95	---	---
14	---	0.73	0.76	0.38	1.08
15	0.88	0.72	0.85	---	---
16	1.43	0.60	0.97	---	---
17	0.72	---	0.64	0.28	0.31
18	1.55	0.60	0.60	0.42	0.75
19	0.69	0.40	0.38	0.20	---
20	1.09	0.42	0.40	---	---
21	1.10	0.42	0.60	0.45	0.56
22	0.82	0.39	0.63	0.46	0.31
90	0.35	0.26	0.37	0.29	0.31
91	0.57	0.37	0.32	0.46	0.15
92	---	0.32	0.29	0.45	0.18

TABLE AIX.83

SWEAT TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 2
(mMol/L)

Subject Code No.	P I	P II	EXP I	REC I	REC II
23	0.47	0.41	1.08	0.37	0.54
24	0.68	0.44	0.42	---	---
25	0.74	0.68	0.51	---	0.36
26	0.82	0.57	0.74	0.48	0.60
27	0.58	1.19	0.24	0.19	0.38
28	1.15	---	0.90	0.75	0.82
29	0.58	0.47	0.55	0.32	0.45
30	0.97	0.68	0.75	0.40	0.52

TABLE AIX.83 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
31	0.50	0.27	0.45	0.24	0.24
32	0.75	0.91	0.57	0.26	0.61
33	0.47	0.31	0.51	0.45	0.61
34	0.50	0.52	0.74	0.32	0.80
35	0.72	0.20	0.70	0.51	0.90
36	0.60	0.18	0.30	0.40	0.46
37	0.67	0.68	1.03	0.57	1.46
38	0.64	0.31	0.49	0.38	0.38
39	0.50	0.19	0.42	---	---
40	0.69	---	---	0.39	0.15
41	0.80	1.19	---	---	0.41
42	0.61	---	1.05	0.42	1.07
43	0.58	0.54	0.57	0.65	0.32
44	0.50	0.55	0.60	0.52	0.44
93	---	---	---	---	---
94	0.63	0.32	0.28	0.11	0.10
95	0.32	0.47	0.46	0.29	0.18
102	---	---	---	---	0.21

TABLE AIX.84

SWEAT TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 3
(mMol/L)

Subject Code No.	P I	P II	EXP I	REC I	REC II
45	1.80	0.39	0.62	0.31	0.41
46	0.65	0.19	0.65	0.37	0.71
47	0.20	0.08	0.73	0.29	0.21
48	1.00	0.19	0.75	0.61	0.41
49	0.63	0.18	0.73	0.46	0.30
50	0.55	0.24	0.82	0.34	0.20
51	1.10	0.51	1.40	0.61	0.36
52	0.45	0.15	0.36	0.20	0.17
53	0.60	0.12	0.40	0.42	0.07
54	0.50	0.21	0.45	0.30	0.13
55	0.55	0.20	0.47	0.26	0.20
56	0.47	0.14	0.29	0.09	0.12
57	0.72	0.18	0.39	0.21	0.21
58	0.65	---	---	0.10	0.15
59	---	0.40	---	0.97	--
60	0.28	0.11	0.42	0.15	0.17
61	0.94	0.50	---	0.42	0.59
62	0.51	0.20	0.65	0.51	0.45

TABLE AIX.84 (Contd)

Subject Code No.	P I	P II	EXP I	REC I	REC II
63	1.25	0.89	1.77	0.65	0.41
64	0.64	0.33	1.20	0.31	0.17
65	0.68	0.21	0.65	0.37	0.13
66	0.81	0.38	1.30	0.58	0.14
96	0.69	0.34	0.20	0.28	0.14
97	0.10	0.22	0.31	0.24	0.11
98	0.75	0.33	0.21	0.10	0.08

TABLE AIX.85

SWEAT TOTAL KETONE BODY CONCENTRATION (SUMMER 1955): FLIGHT 4
(mMol/L)

Subject Code No.	P I	P II	EXP I	REC I	REC II
67	0.68	0.65	1.50	0.42	0.22
68	0.47	0.97	---	0.31	---
69	0.47	0.54	1.40	0.31	0.10
70	0.90	0.28	0.97	0.51	0.18
71	0.33	0.32	0.87	0.19	0.08
72	0.37	0.93	1.05	0.47	0.24
73	0.30	0.42	0.74	---	---
74	0.97	0.63	0.58	0.23	0.46
75	0.30	0.73	1.20	0.25	0.14
76	0.57	0.54	1.25	0.34	0.36
77	1.56	1.25	---	---	---
78	0.51	0.43	1.29	0.38	0.80
79	0.50	1.70	0.57	0.61	0.52
80	0.49	0.73	0.82	0.57	0.52
81	0.70	1.13	1.58	0.61	0.37
82	---	1.25	0.83	---	0.17
83	0.65	2.05	1.31	0.75	0.74
84	0.80	0.92	1.80	0.52	0.37
85	0.45	0.43	0.62	0.34	0.40
86	0.63	0.53	1.68	0.51	0.65
87	0.53	0.43	---	---	0.27
88	0.60	0.64	---	---	---
99	1.46	0.32	1.60	0.24	0.41
100	0.39	0.39	0.31	0.10	0.27
101	0.45	0.43	0.19	0.23	0.21

TABLE AIX. 86

URINE/SWEAT RATIO FOR TOTAL KETONE BODIES IN EXERCISE (SUMMER 1955): FLIGHT 1

Subject Code No.	PRE II	EXP I
1	17.03	15.30
2	14.82	---
3	7.73	32.08
4	13.02	31.86
5	7.88	4.23
6	8.57	17.84
7	4.40	0.71
8	5.74	0.29
9	6.10	31.20
10	5.70	---
11	6.00	9.15
12	5.93	2.00
13	8.34	19.20
14	4.89	8.60
15	2.38	9.04
16	8.50	0.50
17	---	10.60
18	3.80	2.85
19	6.15	8.13
20	12.14	17.70
21	4.57	2.80
22	12.15	7.43
90	20.31	9.81
91	4.22	9.62
92	3.19	2.97

TABLE AIX. 87

URINE/SWEAT RATIO FOR TOTAL KETONE BODIES IN EXERCISE (SUMMER 1955): FLIGHT 2

Subject Code No.	PRE II	EXP I
23	15.51	25.67
24	3.68	7.86
25	6.79	51.29
26	2.89	35.03
27	0.50	37.50
28	---	9.47
29	1.72	7.53
30	2.43	0.53

TABLE AIX.87 (Contd)

Subject Code No.	PRE II	EXP I
31	3.44	---
32	1.85	18.47
33	5.52	6.00
34	4.33	11.03
35	10.50	6.00
36	33.33	10.07
37	2.65	3.82
38	11.13	5.33
39	8.68	9.71
40	---	---
41	3.93	---
42	---	4.31
43	9.44	6.90
44	8.45	8.70
93	---	---
94	1.97	1.50
95	15.57	39.46
102	---	---

TABLE AIX.88

URINE/SWEAT RATIO FOR TOTAL KETONE
BODIES IN EXERCISE (SUMMER 1955): FLIGHT 3

Subject Code No.	PRE II	EXP I
45	12.00	24.97
46	13.26	6.14
47	34.13	7.89
48	20.53	38.72
49	26.00	4.11
50	26.50	3.62
51	5.94	2.14
52	45.60	2.75
53	56.50	3.68
54	18.29	16.53
55	29.10	1.20
56	12.86	1.14
57	40.00	2.69
58	---	---
59	---	---
60	119.46	4.79
61	2.64	---
62	16.95	1.20

TABLE AIX.88 (Contd)

Subject Code No.	PRE II	EXP I
63	6.81	0.20
64	2.91	0.27
65	29.14	5.59
66	13.26	1.29
96	11.12	13.80
97	32.45	6.39
98	11.82	10.43

TABLE AIX.89

URINE/SWEAT RATIO FOR TOTAL KETONE BODIES IN EXERCISE (SUMMER 1955): FLIGHT 4

Subject Code No.	PRE II	EXP I
67	4.20	20.32
68	6.62	---
69	3.61	---
70	22.93	28.15
71	7.78	9.52
72	2.16	5.71
73	10.93	1.26
74	5.95	6.36
75	3.74	8.70
76	8.28	7.92
77	---	---
78	4.40	8.37
79	0.37	4.42
80	2.92	4.76
81	3.50	11.54
82	4.75	8.60
83	2.63	3.94
84	5.35	2.15
85	9.49	---
86	8.77	2.71
87	3.56	---
88	2.72	---
99	28.31	4.28
100	8.23	2.90
101	6.49	12.95

TABLE AIX.90

RESTING MINUTE URINARY TOTAL KETONE BODY EXCRETION (SUMMER 1955): FLIGHT 1 (μMol/min)

Subject Code No.	PRE II	EXP I	EXP II
1	0.37	3.13	4.34
2	0.69	---	---
3	0.49	2.72	2.40
4	0.69	2.50	2.77
5	0.89	0.16	---
6	0.76	0.38	1.92
7	0.79	0.38	1.82
8	0.63	0.29	0.55
9	0.74	5.91	12.68
10	0.63	3.86	7.51
11	0.57	2.05	2.16
12	0.82	7.46	11.64
13	0.63	6.04	---
14	0.65	1.86	4.18
15	0.57	3.28	2.75
16	0.63	2.16	---
17	3.00	2.23	3.99
18	0.73	1.24	1.82
19	0.55	0.59	1.48
20	0.59	0.39	---
21	0.85	0.71	1.43
22	0.28	0.67	1.82
90	0.46	0.52	0.83
91	0.90	0.76	1.12
92	0.62	0.65	0.73

TABLE AIX.91

RESTING MINUTE URINARY TOTAL KETONE BODY EXCRETION (SUMMER 1955): FLIGHT 2 (μMol/min)

Subject Code No.	PRE II	EXP I	EXP II
23	0.85	3.22	1.20
24	0.40	3.02	1.04
25	1.43	3.13	7.39
26	0.96	1.74	3.96
27	---	0.85	0.44
28	1.02	0.78	1.25
29	0.59	0.48	---

TABLE AIX.91 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
30	0.61	0.48	0.72
31	0.96	1.81	0.96
32	0.85	1.36	3.87
33	0.57	0.78	1.37
34	0.45	1.53	4.39
35	0.63	1.67	1.10
36	1.95	2.59	0.86
37	0.70	1.46	0.85
38	0.64	0.77	0.73
39	0.31	0.80	0.69
40	1.89	---	1.90
41	0.99	---	---
42	0.72	1.65	0.77
43	0.68	0.38	0.79
44	0.56	1.02	0.46
93	---	---	---
94	3.61	0.66	0.75
95	1.44	0.67	1.39
102	---	---	0.79

TABLE AIX.92

RESTING MINUTE URINARY TOTAL KETONE BODY EXCRETION (SUMMER 1955): FLIGHT 3 (µMol/min)

Subject Code No.	PRE II	EXP I	EXP II
45	0.71	10.61	1.58
46	0.80	1.49	1.48
47	0.92	28.38	4.39
48	0.87	35.05	3.31
49	0.79	0.89	0.75
50	0.71	0.46	0.29
51	0.70	0.46	0.68
52	0.84	0.36	0.80
53	0.79	6.17	2.15
54	0.76	3.19	1.81
55	0.78	2.75	1.85
56	1.05	1.97	0.77
57	0.85	4.43	1.06
58	1.05	---	0.56
59	2.30	1.87	0.77
60	1.04	4.95	2.19
61	0.72	1.20	0.80

TABLE AIX.92 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
62	0.97	0.20	0.75
63	0.98	1.30	1.19
64	0.76	1.96	2.90
65	1.46	0.81	0.63
66	1.03	0.62	1.21
96	1.32	0.45	0.96
97	0.60	0.60	0.93
98	0.69	1.22	0.78

TABLE AIX.93

RESTING MINUTE URINARY TOTAL KETONE
BODY EXCRETION (SUMMER 1955): FLIGHT 4
(μMol/min)

Subject Code No.	PRE II	EXP I	EXP II
67	0.67	72.00	17.70
68	0.78	11.12	2.30
69	0.39	14.87	4.93
70	0.50	17.51	0.51
71	0.57	1.37	0.52
72	0.57	---	0.44
73	0.45	0.84	0.16
74	2.88	1.30	0.37
75	1.17	11.27	3.83
76	0.71	18.30	4.23
77	0.53	---	---
78	0.47	1.39	0.58
79	0.43	22.24	7.76
80	0.37	10.50	2.85
81	0.71	1.62	0.75
82	1.80	10.20	---
83	0.52	2.19	1.98
84	0.64	0.85	0.99
85	1.30	0.83	0.59
86	0.39	0.36	0.68
87	0.81	---	---
88	0.75	---	---
99	0.62	0.82	0.92
100	0.69	0.80	0.75
101	0.94	1.24	0.99

TABLE AIX.94

EXERCISE MINUTE URINARY TOTAL KETONE
BODY EXCRETION (SUMMER 1955): FLIGHT 1
(μMol/min)

Subject Code No.	PRE II	EXP I
1	1.27	3.15
2	1.81	---
3	0.48	3.17
4	1.82	4.25
5	0.53	1.42
6	0.77	1.98
7	1.03	2.01
8	0.71	0.16
9	0.70	12.53
10	0.64	---
11	0.82	3.24
12	0.81	2.72
13	1.98	4.74
14	1.82	2.42
15	0.58	2.69
16	1.48	0.64
17	---	1.56
18	0.73	0.72
19	0.79	0.71
20	1.68	2.76
21	0.73	1.23
22	2.56	1.78
90	1.95	2.07
91	1.08	2.13
92	0.63	0.81

TABLE AIX.95

EXERCISE MINUTE URINARY TOTAL KETONE
BODY EXCRETION (SUMMER 1955): FLIGHT 2
(μMol/min)

Subject Code No.	PRE II	EXP I
23	2.10	8.32
24	0.63	0.63
25	2.22	7.59
26	0.63	7.26
27	---	1.53
28	0.12	2.32
29	0.36	0.62
30	0.88	0.81

TABLE AIX.95 (Contd)

Subject Code No.	PRE II	EXP I
31	0.74	---
32	0.71	5.37
33	0.96	2.42
34	0.90	6.61
35	0.69	1.13
36	2.88	0.55
37	0.68	1.18
38	2.00	0.91
39	1.04	1.22
40	---	---
41	1.64	---
42	1.73	2.31
43	2.09	1.97
44	2.42	2.61
93	---	---
94	1.01	2.27
95	3.22	5.45
102	---	---

TABLE AIX.96

EXERCISE MINUTE URINARY TOTAL KETONE BODY EXCRETION (SUMMER 1955): FLIGHT 4

Subject Code No.	PRE II	EXP I
45	1.26	4.18
46	0.48	0.72
47	0.79	1.09
48	0.90	5.23
49	1.59	5.28
50	1.46	1.40
51	0.42	0.78
52	1.92	1.09
53	1.56	5.20
54	1.84	2.16
55	1.46	2.31
56	0.94	0.65
57	1.94	1.11
58	---	---
59	---	---
60	2.50	1.05
61	1.27	1.20
62	1.08	0.98
63	1.15	1.13

TABLE AIX.96 (Contd)

Subject Code No.	PRE II	EXP I
64	1.67	0.97
65	1.90	1.78
66	2.02	0.96
96	2.34	2.15
97	1.86	1.66
98	1.79	1.58

TABLE AIX.97

EXERCISE MINUTE URINARY TOTAL KETONE
BODY EXCRETION (SUMMER 1955): FLIGHT 4
(μMol/min)

Subject Code No.	PRE II	EXP I
67	0.66	10.36
68	2.38	11.58
69	0.74	---
70	1.80	8.74
71	0.95	2.80
72	0.86	2.22
73	0.87	1.40
74	1.80	0.74
75	0.87	6.47
76	0.81	6.63
77	---	---
78	0.98	6.48
79	0.96	0.81
80	0.92	1.21
81	2.26	6.20
82	1.78	1.79
83	2.54	1.81
84	1.97	1.20
85	1.22	---
86	1.26	1.73
87	0.81	---
88	0.70	---
99	3.62	4.10
100	3.05	1.53
101	2.04	2.76

TABLE AIX.98

POST-EXERCISE MINUTE URINARY TOTAL
KETONE BODY EXCRETION (SUMMER 1955): FLIGHT 1
(μMol/min)

Subject Code No.	PRE II	EXP I
1	1.24	7.37
2	1.20	---
3	0.24	4.82
4	1.39	13.20
5	2.39	1.74
6	1.69	2.11
7	1.77	1.47
8	0.99	1.49
9	1.93	16.63
10	0.97	11.53
11	2.27	7.37
12	2.46	16.41
13	2.70	5.71
14	2.84	3.79
15	1.03	4.10
16	1.23	1.66
17	---	2.18
18	2.37	1.30
19	0.45	2.35
20	1.10	2.93
21	1.72	2.21
22	3.61	3.11
90	1.83	1.92
91	4.07	2.73
92	1.08	1.21

TABLE AIX.99

POST-EXERCISE MINUTE URINARY TOTAL
KETONE BODY EXCRETION (SUMMER 1955): FLIGHT 2
(μMol/min)

Subject Code No.	PRE II	EXP I
23	2.49	11.92
24	1.05	7.50
25	0.84	13.97
26	1.17	9.22
27	---	2.74
28	0.94	2.54
29	2.06	1.07
30	1.12	1.89

TABLE AIX.99 (Contd)

Subject Code No.	PRE II	EXP I
31	1.30	---
32	0.94	10.36
33	1.10	4.25
34	1.51	13.62
35	1.08	2.94
36	1.67	2.85
37	0.94	3.47
38	1.82	1.96
39	1.13	2.49
40	---	---
41	1.73	---
42	2.76	2.27
43	2.19	2.85
44	2.70	3.03
93	---	---
94	1.29	1.85
95	5.02	6.17
102	---	---

TABLE AIX.100

POST-EXERCISE MINUTE URINARY TOTAL
KETONE BODY EXCRETION (SUMMER 1955): FLIGHT 3
(μMol/min)

Subject Code No.	PRE II	EXP I
45	2.09	13.04
46	1.86	10.16
47	1.13	12.17
48	1.71	19.25
49	1.76	4.09
50	3.49	0.83
51	2.25	1.42
52	2.22	1.97
53	1.70	15.32
54	2.01	8.47
55	1.37	3.69
56	1.44	4.62
57	1.78	2.66
58	---	---
59	---	---
60	3.44	2.01
61	1.17	2.39

TABLE AIX.100 (Contd)

Subject Code No.	PRE II	EXP I
62	2.10	1.03
63	2.16	1.72
64	2.29	0.95
65	2.59	2.76
66	2.03	1.75
96	2.41	2.34
97	1.88	1.67
98	1.43	1.75

TABLE AIX.101

POST-EXERCISE MINUTE URINARY TOTAL
KETONE BODY EXCRETION (SUMMER 1955): FLIGHT 4
(μMol/min)

Subject Code No.	PRE II	EXP I
67	1.04	20.80
68	2.48	11.52
69	1.10	---
70	0.88	10.30
71	1.56	3.38
72	1.07	2.03
73	1.27	1.43
74	1.75	1.44
75	2.04	5.12
76	1.64	9.86
77	3.24	---
78	2.05	2.33
79	1.29	6.83
80	2.16	1.78
81	3.00	2.51
82	2.20	8.04
83	2.45	3.11
84	1.94	1.62
85	1.55	---
86	1.52	2.10
87	4.58	---
88	1.96	---
99	3.30	2.80
100	2.63	2.92
101	2.82	4.14

TABLE AIX.102

TOTAL KETONE BODY CLEARANCE (SUMMER 1955): FLIGHT 1
(ml/min)

Subject Code No.	PRE II	EXP I	EXP II
1	1.12	1.48	2.78
2	2.65	---	---
3	1.58	1.74	---
4	1.25	1.98	---
5	1.51	0.31	---
6	1.55	0.68	---
7	1.11	1.12	3.57
8	1.54	0.57	1.04
9	1.45	6.79	8.29
10	1.12	3.90	2.00
11	1.39	3.11	2.00
12	2.10	7.31	4.08
13	2.03	7.19	---
14	1.16	2.82	1.62
15	1.50	4.37	3.27
16	0.75	4.80	---
17	4.62	2.62	5.96
18	1.16	2.53	2.72
19	0.87	1.55	2.21
20	0.94	1.00	---
21	2.02	1.83	1.99
22	0.76	1.40	2.46
90	0.59	1.00	0.78
91	1.55	1.52	2.11
92	0.97	1.86	1.62

TABLE AIX.103

TOTAL KETONE BODY CLEARANCE (SUMMER 1955): FLIGHT 2
(ml/min)

Subject Code No.	PRE II	EXP I	EXP II
23	1.37	0.63	0.56
24	0.67	0.80	0.55
25	1.39	0.83	3.85
26	1.85	0.41	2.54
27	---	1.15	1.42
28	1.92	1.08	3.12
29	0.70	1.41	---
30	0.84	0.96	1.71

TABLE AIX.103 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
31	1.37	0.56	---
32	1.16	0.42	4.30
33	0.95	0.40	0.99
34	0.66	0.86	5.42
35	0.97	0.81	1.22
36	4.33	1.00	1.79
37	0.93	0.68	1.35
38	1.02	0.35	1.35
39	0.66	0.98	2.88
40	3.86	---	3.88
41	1.43	---	---
42	1.22	2.46	1.17
43	1.15	0.88	1.80
44	1.33	2.22	0.94
93	---	---	---
94	7.08	1.14	1.39
95	1.62	0.84	1.36
102	---	---	1.32

TABLE AIX.104

TOTAL KETONE BODY CLEARANCE (SUMMER 1955): FLIGHT 3
(ml/min)

Subject Code No.	PRE II	EXP I	EXP II
45	1.78	5.80	0.37
46	1.54	0.72	0.80
47	1.88	13.71	0.52
48	1.45	17.35	0.57
49	1.30	0.83	0.83
50	1.54	0.60	0.58
51	1.59	0.92	2.00
52	1.17	0.35	1.48
53	0.96	2.51	1.43
54	1.09	2.31	1.89
55	1.70	3.82	2.57
56	1.22	2.85	1.43
57	1.09	3.89	0.86
58	0.77	---	0.41
59	3.38	1.78	1.60
60	1.51	8.68	4.06
61	0.97	1.60	0.99

TABLE AIX.104 (Contd)

Subject Code No.	PRE II	EXP I	EXP II
62	1.70	0.30	1.42
63	0.95	1.97	2.38
64	0.78	3.92	5.00
65	2.52	1.98	1.31
66	1.13	1.35	1.55
96	2.28	1.22	1.26
97	1.02	0.88	1.37
98	0.79	1.85	1.44

TABLE AIX.105

TOTAL KETONE BODY CLEARANCE (SUMMER 1955): FLIGHT 4
(ml/min)

Subject Code No.	PRE II	EXP I	EXP II
67	0.74	16.22	3.54
68	1.54	6.99	2.95
69	0.53	7.08	0.98
70	0.96	9.57	0.69
71	0.58	4.15	1.00
72	0.55	---	0.65
73	0.69	3.36	0.38
74	2.62	3.17	1.48
75	1.54	9.39	5.19
76	0.68	11.09	3.81
77	1.04	---	---
78	0.65	2.90	0.72
79	0.56	22.46	2.72
80	0.45	38.89	2.16
81	1.04	3.60	1.19
82	2.43	11.72	---
83	0.88	3.37	2.91
84	1.42	1.16	1.57
85	1.46	1.51	0.75
86	0.39	0.46	0.94
87	2.35	---	---
88	1.60	---	---
99	1.24	1.21	1.02
100	0.68	1.18	0.80
101	1.71	2.33	1.11

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Wright Air Development Center, Aero Medical Laboratory, Wright-Patterson Air Force, Base, Ohio.
THE PHYSIOLOGICAL BASIS FOR VARIOUS CONSTITUENTS IN SURVIVAL RATIONS. April 1958. 825p. incl. illus. tables. (Proj. 7156; Task 71805) (WADC-TR-53-484, Part 3, Vol. II) (Contract AF 18(600)-80) Unclassified report

From June 22, 1955, through July 27, 1955, 100 volunteer airmen served as subjects in a study of survival rations in moist heat at Camp Atterbury, Indiana. The original data collected during the 36-day period of study

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